

E3 AND THE STATE OF THE GAMING INDUSTRY

HMM

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TECH LIFE HACKS

FEATURE

**OS WARS
HEAT UP**

**CHOOSING
THE RIGHT
MACBOOK**

TEST

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JABRA BOOST
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PHILIPS



CHOOSING AN OS, IT'S A LOT LIKE LOVE

Apple vs Android. OS X vs Windows. For many people, it's not so much as a battle of choice than an argument of opinion. Those who are vocal about these issues are usually those already set in their ways. I don't blame them. The average consumer ends up being personally invested in their devices and the corresponding ecosystem. It's where your carefully curated list of apps reside, not forgetting your data too.

While we were preparing this issue's feature story on the next generation OS updates from Apple, Google and Microsoft, it became very apparent that developers continue to tighten the boundaries of their platforms. With deeper integration between system and apps, software and hardware, it is even more difficult for users to migrate. The way of the ecosystem essentially means that even if the choice is there, users are reluctant to make the switch unless external factors force them to.

Even I am not immune to this. Up till now, I've

maintained a Windows notebook, iOS tablet and Android smartphone. All three devices were meant for different usage scenarios that don't overlap. Even though it seemed like I was platform agnostic, my devices operated in their own individual silos. It was only when I switched my phone from Android to iOS that I started making comparisons.

Just like in life, one can neither know what one is missing nor how good one has got it if one has never had the chance to experience more.

I guess what I'm hoping to see is the day when developers freely provide the tools necessary to allow hassle-free migration between platforms. This will be the true gauge of brand acceptance and loyalty. And those who return would come back as stronger supporters than ever before.

Zachary Chan
EDITOR



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DS715

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2015

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REGISTRATION FROM 6:00PM

WE LOOK FORWARD TO SEEING YOU THERE!

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Errata: In our In-Ear Headphones Shootout feature in the July issue of HWM (pg 52-63), the Sony headphones featured should be the Sony "XBA-A1AP" headphones and not the "XBA-A1P" headphones as was printed. HWM regrets this error.

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NEW THIS MONTH

Every month, we receive dozens of product announcements and mentions, sit through many a launch event and try out all kinds of devices. All these products are then carefully curated by our crack team of tech gurus. The final list is presented here in Gear and it is our hope you'll find something to geek-out to.



MORE INSIDE >

RAZER MAMBA (2015)
The definitive gaming mouse, upgraded.

SONY ALPHA 7R II
42.4MP BSI full-frame sensor you say?

OPPO PM-3
Aiming for super light aural bliss.

HUAWEI P8 LITE
Flagship looks without the cost.

CANON POWERSHOT G7 X (SG50 LE)

In conjunction with Singapore's golden jubilee year, Canon is introducing an SG50 Limited Edition of the PowerShot G7 X. It features the SG50 emblem on the camera body and pouch, plus a symbolic hue of red on the ring control. Only 500 units will be made. In addition, it will also come with the special 15th anniversary Canon G Series packaging and a certificate of authenticity.



TYLT ENERGI SLIDING POWER CASE

This juice pack gives you an additional 3,500mAh to help power your iPhone 6 Plus throughout the day. The case features a unique two-piece sliding design that allows you to use the dual-layer inner protective case without the battery sleeve. So if your iPhone's battery level isn't in the red, you needn't put up with any unnecessary bulk at all.

RAZER MAMBA (2015)

The 2015 refresh of the Razer Mamba wireless gaming mouse includes a range of new customization options, including the ability to choose the force of your mouse click from up to 14 distinct selections. The new Mamba also includes a 5G 16,000dpi laser sensor that can track across even triple 4K displays. To cap it all off, it now supports Razer's Chroma lighting technology; take your pick among 16.8 million colors and a slew of lighting effects.





OPPO PM-3

Weighing a mere 320g (without cables), the Oppo PM-3 has just laid claim to the title of "World's lightest closed back Planar Magnetic headphones", which really just means great sound in an extremely portable package.

PROTOUCH CENTERAD MULTITOUCH

Built with ergonomics in mind, the ProTouch helps you avoid problems like Repetitive Stress Injury thanks to the inclusion of soft but firm wrist support and a large multi-touch unit that allows you to complete simple tasks like moving the cursor, scrolling, and zooming in and out with much less strain.





TOSHIBA SATELLITE RADIUS (2015)

It's unfortunate that Toshiba's presence in the region is limited because the new Satellite Radius 15 4K Ultra HD Edition is something to behold. At 15.6-inches, it may be on the large side for a 2-in-1, but it is the first convertible with a 4K display. Other features include a precision two-axis hinge for full 360° rotation, Harman Kardon speakers and is designed for Windows 10 with a dedicated Cortana key.

HUAWEI P8 LITE

The Huawei P8 Lite is a stripped down version of Huawei's flagship P8 smartphone. Armed with a 5-inch HD display, the P8 Lite is powered by an in-house HiSilicon Kirin 620 octa-core processor, 2GB RAM and runs on Android 5.0.2 Lollipop.





SONY ALPHA 7R II

Sony continues its evolution of their Alpha 7 series with the new A7R II interchangeable lens camera, now boasting the world's first 42.4-megapixel full-frame back-illuminated CMOS sensor, up to 40% faster AF response and 399 focal plane phase-detect AF points. Additionally, you'll get 5-axis image stabilization, 4K video recording in Super 35mm formats and a refined XGA OLED Tru-Finder with one of the highest viewfinder magnification ratios (0.78x) available today.

JABRA MOVE WIRELESS IN GOLD

Jabra introduces a new color to its Jabra Move Wireless headphone line. In addition to their current selection comes the all new Gold edition. The rich gold tones of the headphone slider adds a new level of luxury to the otherwise black design. The Jabra Move Wireless in Gold promises the same level of fuss-free comfort and premium sound quality as its predecessors, just with more bling.





LG 79UF950T

Equipped with a proprietary Wide Color Gamut tech to realize greater color depth and more lifelike images, the UF950T ColorPrime is LG's flagship LED LCD 4K TV series. It's decked with the latest features like a quad-core processor, 4K HEVC 60p support, and runs WebOS 2.0. The stunning 79-inch model, which goes for \$12,000, is the one to go for if you can afford it.

HYPER

WARNING

LISTEN UP! YOU'RE SURROUNDED



HyperX
CLOUD II

The HyperX Cloud II Headset delivers an unparalleled auditory experience that captures every sound and movement on the battlefield. Equipped with 7.1 virtual surround sound and a built-in DSP sound card, it transforms fantasy into reality. The boom on the HyperX Cloud II transports you to a virtual world and puts you right at the center of the action.



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Kingston
TECHNOLOGY

HOW ANNA, A SMALL BUSINESS OWNER, REDUCED COSTS AND INCREASED PRODUCTIVITY WITH A NEW PRINTER

Ink tank system printers are a new kind of printer that actually help you save money on ink – here's how it works.

Anna has a problem. Her company of 12 is expanding, and they need a new printer for the office. She's wary of buying a new one, the old printer came cheap but its ink cartridges were surprisingly expensive. Like all small medium businesses, Anna has to keep her company's costs low and productivity high to stay in the game.

That's when she decided to give the new Epson L655 ink tank system printer a go.



WHAT ARE INK-TANK SYSTEM PRINTERS?

If you haven't bought a printer in a while, an Epson ink tank system printer might surprise you. Many printers these days are sold cheaply, with pricey ink cartridges. Epson's ink tank system printers reverse that. The printers are sold at a more realistic rate, but the ink refills are sold at significantly lower prices.

These printers are just what they sound like; they come with ink tanks attached to the side, which are connected to the printhead inside. Instead of paying for expensive ink cartridges, all users need to do is refill the ink tanks with low-cost, original bottles of ink.

ANNA'S PRINTS HAVE TO LOOK GOOD

Anna worried that the Epson L655 might sacrifice print quality for cheap ink. She has to print numerous documents, not just within the office but also for her clients, so the prints have to look good, especially the ones in full color. When the first prints of her company brochures came out, Anna breathed a sigh of relief – they looked even better than the ones from her previous printer.

The L655 is the first printer to incorporate Epson's advanced PrecisionCore technology printhead, a new generation of printheads that are made possible through proprietary "MEMS" manufacturing methods. These ultra-durable, ultra-high performance printheads allow the L655 to achieve the highest printing speeds in its class. Variable size droplet technology (VSDT) allows the printhead to eject precise ink droplets in multiple sizes, and with a maximum resolution of 4,800 x 1,200 dpi, the L655 prints with rich details and smooth tones.



THIS IS HOW ANNA CAN WORK FROM HER SMARTPHONE

More and more, Anna's answering emails and receiving documents on her smartphone, instead of on her laptop.

That's why she appreciates the L655's wireless capabilities.

Thanks to the L655's built-in Wi-Fi and Wi-Fi Direct feature, Anna can print

documents directly from her smartphone. With the Epson iPrint app, she can even scan documents on the L655 and send them directly to her smartphone. It's convenient and saves Anna the hassle of having to go to her laptop just to print.

Plus, the ADF (automatic document feeder) helps Anna and her colleagues save time; they can leave the L655 unattended for multi-sheet document scanning, copying and facing. Automatic duplex printing lets them print on both sides of the paper, with the lowest cost of printing duplex around*. With the 2.2" mono LCD screen, her colleagues have no problem using the machine, even without reading the manual.

***As of 10 April 2015, the Epson L655 offers the lowest cost of printing duplex (cost per two-pages), for any inkjet printer capable of auto-duplex, using genuine branded supplies from its own manufacturer. This is based on the MSRP listed on the manufacturer's websites in 5 major ASEAN markets.**

REFILLING TURNS OUT TO BE SURPRISINGLY EASY

It took far longer than Anna expected, but she finally had to refill the inks on the L655. She was worried that it would be a messy, complicated task, and took the ink tanks outside in case the inks spilled. But Epson's ink bottles come designed with a smart tip for mess-free refills, and Anna finished refilling the ink easily, without any spills. She thought it was a nice touch that the ink bottles had resealable caps for storage, in case there was some ink left over.



THE CONCLUSION?

A printer is one of those things you don't really think much about, but actually has a big impact on a company's bottom line. Anna found that the Epson L655 ink tank system printer saved her and her colleagues both time and money, with its multiple capabilities and low-cost ink refills. When Anna broke down her ink costs, the differences were obvious: her old printer had a mono page yield of S\$0.025 per page, and a color page yield of S\$0.075 per page. The L655 gives her a mono page yield of S\$0.0032 per page, and a color page yield of S\$0.004 per page.

It also gave Anna peace of mind that Epson offers their customers two years carry-in warranty, or 50,000 pages, whichever comes first.* This meant that there would be no additional charge for replacement parts during the warranty, including for the printhead.

Looking back, Anna realized that she shouldn't have worried. Giving the Epson L655 printer a chance turned out to be a great decision for her and her company.

***Standard warranty period is one year, with an additional year's warranty activated upon online warranty registration.**



PRECISE TECHNOLOGY, REMARKABLE PRINTS

Epson's L-Series has got the printer you need for large photo prints or quick office documents, all while saving costs on ink.

PRECISE TO THE CORE

The L655 is Epson's top-of-the-line L Series Ink Tank System printer, and the first to use advanced PrecisionCore technology. PrecisionCore is a new generation of ultra-durable, ultra-high performance printheads. They achieve the highest printing speeds in their class, allowing the L655 to reach ISO prints speeds of up to 13.7ipm (mono) and 7.3ipm (color), making it the fastest Epson ink tank system ever. The L655 is further equipped with Ethernet, Wi-Fi, Wi-Fi Direct and Epson Connect, with a convenient 30-sheet ADF and automatic duplex printing.

L655 DUPLEX & WI-FI ALL-IN-ONE INK TANK PRINTER



SUPERIOR COLOR AND DETAIL

The Epson L1800 prints large photos and graphics with superior colors and amazing detail. It can print borderless, high-quality images from 4R up to A3+ in size, and up to an astoundingly high resolution of 5,760dpi to present the most intricate details. Epson's renowned Micro Piezo™ printhead, designed for continuous printing and high durability, makes this performance possible. Paired with the expanded color gamut of six photo inks, the L1800 creates true-to-life color, graduation and tones in every printout.

L1800 A3+ PHOTO HIGH PAGE YIELD INK TANK PRINTER



CONNECT WITHOUT CABLES

Designed for the home and small business users, the Epson L455 makes it easy to connect over the air to the printer, with Wi-Fi, Wi-Fi Direct and Epson Connect capabilities. Not only can you print wirelessly using desktop or mobile devices, you can also scan and copy from the L455 over the network. A 1.44" color LCD screen makes it easy to navigate the L455's features, as well as makes it easy to see and select images for printing using the built-in memory card slot reader.

L455 WI-FI DIRECT ALL-IN-ONE TANK PRINTER



DESIGNED FOR SMALL BUSINESSES

The Epson L120 is perfectly designed for the small business owner; not only is it more compact than previous models, it's also faster, with print speeds of up to 8.5ipm (mono) and 4.5ipm (color), increasing time saved dramatically. Epson's genuine ink bottles are specially formulated to deliver high-quality prints with long-lasting quality at the world's lowest printing costs*. Every bottle is individually sealed to ensure the ink's purity, and comes with a smart tip for mess-free refills.

L120 HIGH PAGE YIELD INK TANK PRINTER



INK TANK SYSTEM PRINTER L655

EPSON
EXCEED YOUR VISION

DOUBLE-SIDED PRINTS.

**WITHOUT
DOUBLE-SIDED
INK BILLS.**



To help small businesses go further, the **Epson L655 Original Ink Tank System Printer** offers out-of-the-box printing solutions. It's the world's first and only ink tank duplex printer fitted with Epson's revolutionary PrecisionCore printhead technology. What does that mean for your business? High quality, high speed, high volume double-sided prints at the lowest cost per page*. With genuine Epson inks, you'll enjoy black and white printouts with sharp texts that is water and smudge-resistant. When looking for big business solutions, think outside the printer.



PRECISIONCORE

Visit www.epson.com.sg/INKOutsidePrinter to find out more about the **Original Epson Ink Tank System Printers**.

Epson Help Desk: 800 120 5564

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ENGINEERED FOR BUSINESS

*As of 10 April 2015, the Epson L655 offers users the lowest cost of printing duplex (cost per two-pages), for any inkjet printer capable of auto-duplex, using genuine branded supplies from its own manufacturer. This is based on the MSRP listed on the manufacturer's websites in 5 major ASEAN markets.

LIVE YOUR BEST DIGITAL LIFE

Work and play better with PROLiNK's latest gear.

ALL ABOUT THAT WIRELESS BASS

The Fervor Tune is a powerful, lightweight Bluetooth stereo headset designed for the pure audiophile. It delivers crisp, studio-quality sound, and natural-sounding bass that doesn't sacrifice the mid and high ranges. With NFC built-in, you can simply tap your NFC-enabled smartphone to instantly create a Bluetooth connection. Enjoy clear calls with the built-in noise-cancelling microphone, and play up to 11 hours of music with the rechargeable battery.

PHB6002E FERVOR TUNE



EXAMINE AND EXTEND

Forget about complicated router settings or confusing network configurations. The PIC2001WE is an IP camera that's easy to set up, and lets you view live, high definition 720p video, through its PC and smartphone app, from anywhere in the world. Backup the video easily, using the built-in microSD card slot. The PIC2001WE is also a Wi-Fi extender, making it a convenient way to both monitor your location and extend wireless coverage.

PIC2001WE TRUE PLUG & PLAY WIRELESS-N MEGAPIXEL IP CAMERA



CONQUER WITH THE LIGHT

Dominate your game with the FUSCUS Illuminated gaming mouse. The chassis has been designed to fit naturally; with an ergonomically designed thumb rest for quick rests during loading. A quick switch button lets you swiftly toggle between four DPI settings, and six clearly defined buttons let your hand know precisely where each control is without having to look. Light up the way to victory with the seven-color breathing LED lights.

PMG9005 FUSCUS ILLUMINATED GAMING MOUSE



WIRED NETWORKING AT ITS BEST

The PSG2420M 24-Port 10/100/1000Mbps Gigabit Ethernet Switch is a rack-mountable switching hub that lets you connect up to 24 devices at a time. This robust system is housed in a secure metal housing, which has been designed to pack maximum efficiency inside minimal space. Using a Store-and-Forward switching method, the PSG2420M eliminates bad data frames from the network, ensuring a high level of error-free network traffic, with support for 1,000Mbps in Full-Duplex mode.

PSG2420M 24-PORT 10/100/1000MBPS GIGABIT ETHERNET SWITCH



SUPER SPEED IN A PORTABLE PACKAGE

Connect your computer to multiple devices easily with the PUH301 USB 3.0 4-port Super Speed Mini Hub 5Gbps. This portable hub lets you connect up to four heavy-duty USB devices, like external HDDs, without the need for an external power adapter. With USB 3.0, data will be transferred in the blink of an eye with rates of up to 5Gbps. It's so small, you can bring it anywhere you go, and it's fully plug and play, no additional software needed.

PUH301 USB 3.0 4-PORT SUPER SPEED MINI HUB 5GBPS



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DESIGN

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- 6 buttons
- 4-level quick switch DPI button
- Backward & forward button
- Cord grip to improve durability

Compatible with:



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With a high power output of 2.1A, the PowerBank F series recharge your devices as quickly as possible. Various safeguard mechanisms are built right into the PowerBanks, like under-temperature, over-charging, discharging and overload protection, which help to prolong battery life.

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The PowerBank F series have also been designed to be perfect travel companions. They fully comply with UN38.3 air transportation standards, and automatic power modulation for various voltages let you plug in and use the PowerBanks, no matter which country you go to.

The PowerBanks are encased in strong aluminium chassis with elegant matt finishing, with smart LED lights to indicate progress and battery strength. They have been thoughtfully designed with flat and concave surfaces on either side, which let you neatly rest either curved-back or flat-back devices on the PowerBanks. They also come in black or silver, to best fit your personal style.

The PowerBank F series come in three capacities: 5,000mAh (FP05M), 5,200mAh (FN05M), and 10,000mAh (FP10M). They are compatible with iOS and Android smartphones; tablet PCs and numerous other USB devices.



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- Smart LED status indicator

Plano-concave* dual front design



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CHARGING MADE SIMPLE

One of the problems with regular power banks is the need for external cables which can get into a tangled mess in your bag. The Powerstation Plus by Mophie offers a solution with its built-in cable that comes in either a Lightning or microUSB variant. You can also choose from a variety of capacities, expanding the battery life of your device up to eight times. **Mophie Powerstation Plus**



POCKET EYES

The Polaroid Cube+ is a tiny, splash-resistant action camera that measures just 35 x 35mm. It sports a 6MP camera and 124° wide-angle lens that is capable of capturing up to 1080p video. The Cube+ also comes with Wi-Fi capabilities, which means you can sync it with your iOS or Android device via its mobile app. Users will then be able to capture, share and edit photos and videos instantaneously, in addition to controlling the camera with their smartphone. **Polaroid Cube+**



DATA ON THE MOVE

Have a spare data SIM? Why not put it in a mobile Wi-Fi hotspot device and share the love? The Prolink PRT7007L supports 4G LTE (150Mbps) speeds, up to 15 connected Wi-Fi users and boasts 8 hours of battery life. It has a concurrent dual-band feature, which means you can get two separate wireless networks at the same time on 2.4GHz and 5GHz bands. **Prolink PRT7007L**



RETHINKING THE BOILING KETTLE

Miito is a minimalist device that heats liquids directly in their containers. This allows you to heat up what you need, all in the name of environment sustainability. To get started, just drop the metal rod into your container, and the induction base will heat up the rod, and via conduction, the liquid gets heated up too. Say goodbye to excess with Miito! **Miito**

VOLUME CONTROL ON-THE-FLY

The popular Razer Kraken Pro gaming headset has just received a feature update to include in-line volume and mic controls. That was a feature that was sorely missing on the original Kraken Pro, and gamers will be glad that they can now adjust their volume on-the-fly and mute their microphone with the flick of a button. That's about it actually. It retains the features of the original, with a fully retractable microphone, 40mm neodymium magnet drivers, and plush circumaural earcups.

Razer Kraken Pro



PERFECT FOR TRAVEL

Looking for a travel camera that packs reach without the bulk? The DSC-WX500 should be right up your alley then. With a 30x (24-720mm) Zeiss Vario-Sonnar T* lens and a quality 18.2-megapixel Exmor R CMOS sensor that uses Sony's Bionz X image processor, you'll be sure to get great images that are bright and crisp, with vivid contrast and good colors. **Sony DSC-WX500**



SEVEN TIMES THE POWER

Weighing 4.7kg, the Sony SRS-X99 is literally a heavy-weight speaker and it has the performance to boot. It has a seven-speaker setup with two extra up-firing tweeters and a 94mm diameter subwoofer for real booming bass, but that's not all. It's also a multi-room speaker, meaning you can use it in conjunction with other multi-room units to blast your music everywhere. Great for parties, and make sure you invite the neighbors along. **Sony SRS-X99**



NOW EAR THIS!

Fischer Audio Dubliz earphones are built with quality materials such as aviation-grade aluminium and newly-developed 8mm and 10 mm drivers using (DDT) Dual-Diaphragm Transducer technology. The Dubliz promises detailed sound as close to a real concert as you can get and . The earphones will be available in two colours, Gunmetal and Gold (with microphone). **Fischer Audio Dubliz**

MINIMALIST ELEGANCE

From the Designo display series, this 27-inch WQHD monitor features an AH-IPS panel with a maximum resolution of 2560 x 1440 pixels. To stretch things further, its razor-thin bezel provides near edge-to-edge viewing pleasure. It boasts of a sundial-inspired base and the entire monitor has an elegant brushed metal finish. In addition, it features proprietary SonicMaster audio with ICEpower, a Bang & Olufsen technology, and AudioWizard functionality for listening pleasure. **ASUS 27-inch Designo MX27AQ**



NOTEBOOK ADAPTER UPSIZED

If it wasn't necessary to charge your notebook, no one would lug around their power adapters. The FSP NB H 110 is a third party adapter that provides additional utility to the power brick with three integrated USB 3.0 ports. It can act as a USB hub and be used for charging mobile devices too. It has a 110 watt power output and features seven different charging tips for compatibility with most notebooks from major brands like Acer, ASUS, HP and Lenovo. **FSP NB H 110**



GET A GRIP

Struggling to get more distance with your golf swing? Experts say it's all in the grip. And the SensoGlove is one golf glove that comes packed with sensors to help you detect just how much pressure you're applying - down to the individual finger. Get real-time audio and visual feedback so you can correct your swing as you play. **SensoGlove**



BABY WRT ROUTER

The Linksys WRT1200AC router is a dual-band AC1200 class router that offers data transfer rates of up to 400Mbps and 867Mbps on its 2.4GHz and 5GHz bands respectively. It is powered by Marvell's latest dual-core Armada SoC that runs at 1.3GHz and comes with 512MB of RAM and 128MB of onboard flash memory. It also support Linksys' Smart Wi-Fi user interface and can be customized with open source firmware from the OpenWRT community. **Linksys WRT1200AC**

RE-USING OLD PHONE BATTERIES

If you have a spare cell phone battery tucked away somewhere, it could still come in handy. As it turns out, old batteries could have about 80% efficiency left in them, and the Better RE can package them into a reusable power pack for your current devices. It uses a slide-and-clip system that takes batteries up to 58.5 x 97.8 x 6.5mm – the largest size currently on the market – and features an elegant design comprising aluminium and wood. **Better RE**

FEEL YOUR RIDE

PS3 and PS4 owners rejoice! The Logitech G29 Driving Force is coming to gaming shops near you soon. The controller features a dual-motor force feedback transmission with anti-backlash helical gearing, hand-stitched leather-wrapped rim, and stainless steel throttle, brake, and clutch pedals to let you feel everything from weight shift to tire wear on your car. **Logitech G29 Driving Force**



ROUGH AND TUMBLE

The Mudmaster is the latest G-Shock from Casio combining the best of the popular Mudman and Rangeman models. It is specially designed to withstand harsh environments working amid mud and rubble plus vibrations from equipment and rough terrain. It has digital compass, thermometer, barometer and altimeter functions with Tough Solar charging. **Casio G-Shock Mudmaster GWG-1000**

MICRO HI-FI WITH A DIFFERENCE

It looks like your regular Micro Hi-Fi, but the CMT-SX7 is actually a multi-room capable wireless speaker that fully supports High-Res Audio. Because it's Wi-Fi enabled, you can also use it to access various music streaming services, and be able to control the system via Sony's SongPal app on your favorite smart device. **Sony CMT-SX7**

COMPACT & POWERFUL

The new RX100 IV is built with the world's first 1.0-inch type stacked Exmor RS CMOS sensor with advanced signal processing and an attached DRAM memory chip. This compact also comes with features previously only available on professional cameras such as 40x super slow motion video capture, an anti-distortion shutter with a maximum speed of 1/32,000 second, and 4K video recording. **Sony RX100 IV**



NAVIGATION MADE EASY

The TomTom GO 510 and 610 now comes with Lifetime World Maps which allows access to the latest maps all around the world at no extra cost. You won't need to worry about checking for speed cameras too, as these new models also comes with Lifetime Speed Camera updates. Additionally, you can use a smartphone to review real-time traffic, plan routes, and send destinations to the TomTom GO. **TomTom GO 510 & 610**



MORE THAN A BRACELET

The TokyoFlash Kisai Link doesn't look like a tech wearable and that's what makes it so great. It sends notifications of incoming calls, emails or text via low vibrations and an LED indicator. It connects via Bluetooth to your smartphone, lasts up to five days on a charge, weighs less than 10g. What's more, it comes in 28 varied designs, so you will be sure to find one that will suit your personal style. **TokyoFlash Kisai Link**



SWEDISH INNOVATION

Currently the world's smallest earphones with exchangeable cables, the new q-JAYS feature custom-made threaded connectors that allow you to choose between dedicated cable modules for Audio Only, iOS, Windows and Android. Dual balanced armature drivers and tailor made acoustic filters make for a frequency range of 5Hz-20kHz, ensuring you get true full-spectrum sound. **Jays q-JAYS**

GOES WHERE IT SHOULDN'T

Other than being capable of blasting out 360-degree sound, the UE Roll is also shockproof and IPX7-certified waterproof, so you can literally throw it around without a care. There's a marine-grade bungee cord attached so you can connect it to your swimsuit or hiking pack and the speaker set has a nine-hour battery life and a 20m wireless range. **UE Roll**



MAXIMIZING PRODUCTIVITY

The Canon iR-ADV C3300 series features new V² (Vivid & Vibrant) imaging technology, onscreen walkthrough videos to help users with cumbersome troubleshooting and an eco-stapling function to help save time and reduce paper wastage. There are also added security features that help alert you upon a job completion, especially useful if you tend to forget picking up a confidential documents in the feeder. **Canon iR-ADV C3300 series**



HD AUDIO PERFECTED

FiiO threw in so many upgrades to the new X5 II HD Audio player that it's hard to list them all, but here's what you need to know. It's 15% lighter and 12% more compact than the original, has a new 14V power gain, twin crystal oscillators and can act as a USB DAC. It also supports native DSD64/128 decoding as well as direct SACD ISO playback with a good 10 hours of battery life. **FiiO X5 II**



AMD GRAPHICS REFRESH

The MSI R9 390X Gaming 8G graphics card features a rebranded Hawaii GPU that now known as Grenada. The card packs more powerful video memory too with 8GBs of overclocked GDDR5 modules. Due of its large Twin Frozr V cooling system though, it takes up the space of three expansion slots! Its two Torx fans feature ZeroFrozr technology for quiet operation; they also work independently for optimized cooling. **MSI R9 390X Gaming 8G**

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THINK

GAMING INTO THE FUTURE

■ The video games industry looks like it's thriving on the outset. Hardware advancements with ever increasing performance gains are a constant and e-sports has never seen more recognition than it has in the past two years. Yet, games development seems to have hit a roadblock. Can user generated content and crowdfunding revitalize the stagnation of creativity and originality?

Text by *Salehuddin Husin*

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**SUMEET SINGH,
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As the mobile landscape continues to grow, so do the threats that target these devices. Is it really all doom and gloom for the future?

**TOSHIHARU
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Innovations in hybrid projection technology means exceptional brightness and performance with almost zero maintenance.

YAO GUAI



IS CROWDFUNDING THE SAVIOR OF GAMES DEVELOPMENT?

Making games is a business. And business is about making money.

by Salehuddin Husin

Combined with increased development costs, game announcements over the past few years have basically been relegated to the few key franchises such as Call of Duty and Battlefield. Innovation is all but lost to the factory churning of essentially the same game with little change to the formula except for better graphics and maybe more guns. Like the rest of the entertainment industry, even critically acclaimed games get axed if they aren't deemed a financial success.

With the advent of crowdfunding, gamers have more say now than ever before in what games they get to see released. Crowdfunding is also slowly becoming one of preferred methods creators from beloved (but ignored) franchises turn to now.

Take Koji Igarashi, or IGA as he is known by his fans. IGA used to work for Konami on their seminal Castlevania series. The man led the team behind what is arguably one of the best examples of 2D gaming in history, Castlevania: Symphony of the Night. It was influential enough that it created a whole new genre, lovingly called the Metroidvania (or IGAvania) since it combined the map exploration elements of Metroid, with Castlevania themes and signature gameplay.

That should be enough for Konami to want to keep IGA around; letting him make the kind of game he does best. While it was that way initially, IGA slowly saw creative control slip as Konami slowly prioritized mobile gaming over traditional console gaming. Mobile gaming was cheap and profitable; two words no company could ignore. IGA and the beloved Castlevania series slowly faded from obscurity. While Konami recently attempted to reinvigorate the Castlevania brand with the Lords of Shadow games, IGA had no part to play in them and as a result, the games were totally different from the Castlevania games that IGA helmed. IGA himself played a diminishing role in Konami, getting shuffled from project to project, eventually moving to Konami's mobile division. That too didn't pan out, and IGA parted ways with the company.

IGA resurfaced in early May this year and in an unprecedented move, took to Kickstarter to gather funds for Bloodstained: Ritual of the Night, a spiritual successor to Castlevania: Symphony of the Night. It wasn't Castlevania only in name.

IGA bucked the trend, utilizing Kickstarter in a wholly different way than before. Whereas most creators come to Kickstarter to get funding, IGA had already secured the majority of the funding for Bloodstained before even turning to Kickstarter. IGA made that clear from the get go. He went to Kickstarter as a way to reach out to his most

dedicated fans and let them to be involved with his latest game. It was also a way to show his backers there's a demand for the types of 2D games he excels in creating. Asking for a measly US\$500,000, the project raked in more than US\$5.5 million by its close, which not only allowed IGA to expand on his original idea but also fund different versions AND a separate prequel game. With that amount of money at stake, you can bet that major publishers and developers are sitting up and taking notice.

The trend of having a major backer ready to commit, depending on Kickstarter response, will definitely continue. After all, it's basically a win-win for everybody involved. If the Kickstarter is successfully funded, fans who want

the game get what they want and the backers are guaranteed a successful investment return. On the other hand, if the Kickstarter fails, the major backers lose nothing. They don't need to front the money to develop a game that won't sell and that nobody is interested in buying.

The second trend is that beloved franchises that are ignored by their IP owners might actually be revived in other ways than via big publishers.

Like Bloodstained, the revival might not come from the series themselves; instead it could come from a spiritual successor, which shares most of the themes and style of the original. Then again, in rare cases, IP owners might actually let somebody they trust handle the IP. Take Shenmue 3 for example, which was just recently announced at Sony's E3 press conference.

The game was been requested by fans for more than a decade. SEGA, the IP owner, wasn't interested in creating another Shenmue game, despite the demand. But due to Kickstarter, Shenmue's creator, Yu Suzuki was able to convince SEGA to let him borrow the IP for a sequel. Sadly though, Shenmue's Kickstarter campaign has been plagued by bad press from the get go. Unlike IGA who was upfront with the purpose for creating his Kickstarter campaign, Suzuki wasn't as transparent regarding Sony's involvement with the game, nor was he particularly candid about the asking amount.

The US\$2 million asking amount was just the minimum needed for Suzuki to create Shenmue 3. It was later revealed that US\$10 million was actually needed for the game to be exactly how Suzuki had planned it, a far cry from the project's initial goal. Gamers were understandably miffed, with many crying foul. While Suzuki has gone on to do damage control, the Kickstarter campaign for the game has stalled. Initially expected to get at least US\$5 million, the project hasn't even broken the US\$4 million mark with just a little over two weeks before its end date.

"With the advent of crowdfunding, gamers have more say now than ever before in what games they get to see released."

USER GENERATED CONTENT: MODDING GOES MAINSTREAM

The one where developers let users make their games for them.

by Salehuddin Husin

User generated content started life around the same time as PC gaming (the Amiga had the 'Construction' series), but it didn't really catch on till late 80s/90s. It wasn't until Doom came along around 1993 that user generated content gained popularity. Gamers found they could mod (short for modify) the game's .WAD data files to include anything from custom sprites, models and maps to total conversions that basically changed the way the entire game was played.

This proliferation of user generated content continued unabated for the rest of the decade. Subsequent games not only made creation of custom content easier, they sometimes even shipped with the very tools the developers themselves used. Warcraft 2 shipped with a basic map editor that spawned countless custom maps to play on. Duke Nukem 3D famously shipped with its Build engine tools which allowed budding game designers and modders to have a go creating their own maps.

Things took a turn for the better after the Build engine was released. Developers took note of the interest in user generated content and with the Internet starting to become mainstream, made the tools they included in their games easier to use and with much more documentation available. Unreal Tournament's UnrealED was a much more streamlined map editor, especially when compared to how Build was at initial release.

The next substantial milestone in user generated content came with Minecraft. Unlike previous map editors or creation tools, Minecraft isn't really a game in the proper sense. It's a sandbox experience where the goal is ultimately up to the player. Like Build or UnrealEd, Minecraft was essentially a map editor at its heart, except you're working in the map in real-time.

While sandbox type games were nothing new by the time Minecraft released, it was a novel experience because it took a creative aspect to the game, instead of having a sandbox open-world story-driven game like Grand Theft Auto or the Elder Scrolls games. In fact, it can also be said that Minecraft started the current sandbox survival craze on the PC with games like DayZ, H1Z1 and Rust. Still, the subgenre is already starting to peter out so unless something revolutionary comes along, we don't really foresee that it'll be a big thing in the future.

Bethesda Softworks' Fallout 4 is set to allow users to add custom, user content to the Xbox One version of the game. Mod support for the PS4 is also coming, though it might not make the game's launch unlike the Xbox One version.

What mods Bethesda will allow though, remains to be seen. Obviously nudity (despite there being numerous games on consoles with nudity) and copyrighted materials

will be off-limits, but where exactly will the company draw the line? Let's say though that Bethesda is successful. What's next from there?

Simple, we'll get more tools dressed up as games instead of actual games. For instance, Little Big Planet on the PS3 (and its numerous sequels) might be marketed as a game but it is an ingenious tool that allows tons of user generated content within its confines. To this day, the LBP games have dedicated communities, churning out levels and new modes for the games.

The Xbox One too has its version of Little Big Planet, though it's arguably much more flexible, fleshed out and accessible. Called Project Spark, the software (also available on Windows 8.1) is much more a game creation tool in the guise of a game, rather than a game that comes with creation tools as in LBP's case.

Project Spark is so malleable that users can customize the experience to their liking. Games of nearly all genres have been birthed from the Project Spark community, using the main software as the backbone. Project Spark, while the first of its kind on current consoles, probably won't be the last we see publishers try something similar, with much more freedom.

Project Spark, for all its innovation, is still too rigid. You're stuck within the confines of the system. You can't create custom assets; you simply buy them off the marketplace. That's the drawback with user generated content; content that a user wants might not be the content they can create without custom assets. But by allowing custom assets, a whole can of worms is opened as copyright and other legal issues will likely arise.

In the future though, Project Spark might be the great grandfather of user created content on consoles. We're wondering though if we're getting too much of a good thing, too soon. With the bar for user generated content getting lower and lower, how long before we get a drop in quality? What once required proficiency in coding and design is being dumbed down. While it's great that game programming engines are becoming so accessible, it's also a double-edged blade.

The trend will undoubtedly continue, but like the past few decades, will be relegated to the PC realm. All three console manufacturers are notoriously stringent on what gets on their systems and we just don't see them opening the floodgates to truly let the user generated content take hold.

We honestly hope so. Consoles are already becoming too much like PCs nowadays with install times and patches now becoming mandatory. We don't need the extra hassle of having a billion different user generated content which basically do the same thing, we have the PC for that.

"The next substantial milestone in user generated content came with Minecraft."



In the age of mobile, connected devices

SUMEET SINGH
HEAD OF SECURITY SALES ENGINEERING, ASIA
AND JAPAN, VERIZON ENTERPRISE SOLUTIONS

by Koh Wanzhi

Many security reports cite a convergence of threats in the mobile space as a cause for great concern. To what extent is this justified?

While there may have been an uptick of malware targeted at mobile devices, Verizon's 2015 Data Breach Investigations Report (DBIR) found that just 0.03% of mobile devices – out of tens of millions of them – are infected with malicious exploits. This is really quite a negligible amount, and for now at least, mobile devices are not the preferred vector in data breaches. However, that doesn't mean that mobile security is not important – the vulnerabilities just have not been exploited fully. Furthermore, it is actually one of the key foundations of enterprise security. Businesses need to strive for visibility and control when it comes to their mobile assets. This involves understanding the type of devices in use in the organization and having a good awareness of the potential threats. This will help them implement proper security controls and safeguard themselves.

Why then is there so much alarm surrounding mobile devices as a source of data breaches?

People tend to be more lax on security when it comes to mobile devices. For instance, we are more likely to use a complex password on our laptops, but fewer of us do the same for our smartphones. This already sets mobile devices up to be more vulnerable, but this can be easily prevented if we just apply the same security protocols to them. At the end of the day, it all comes down to awareness.

The Internet of Things is growing rapidly. What does this mean for data security?

The rapid proliferation of connected devices means that there are going to be countless devices from a variety of manufacturers. It's difficult to embed security software in all these devices, especially given the low cost at which they are produced. In fact, it was recently demonstrated that it is actually quite easy to access the feeds of connected webcams via the broadcast website. This doesn't even involve any hacking per se, and it's made possible because many consumers don't bother changing the default passwords of their devices.

The obvious question then is: why don't consumers change their passwords? But we first need to ask if manufacturers have made it easy for consumers to do so, or if consumers are even aware that they need to. Furthermore, can these devices be patched to protect users from new risks?

These are all questions that need to be worked on. The vast majority of devices are intended to come in at an economical price point, so we're really in a situation where security measures have to play catch-up with the threat landscape.

Where does cloud security tie in with all this?

This is particularly significant in the area of wearables like fitness trackers and smart watches. Wearables collect things like location data, and this information is often stored in the cloud. It then becomes important to be able to properly manage and secure this data. There have to be

safeguards for user privacy. Cloud service providers need to have robust abilities to secure application data. However, it's no longer enough for service providers to secure data on their end, and applications need to do their part as well. It's really a two-way street when it comes to security.

How will the rise of open-source platforms for affect the security of IoT devices?

It's a misconception that open-source platforms lack a focus on security. There are security standards out there, and as long as they are adhered to, open-source platforms can be quite secure as well.

Take the comparison between Apple and Android for example. Apple generally enforces much more stringent checks and guidelines when it comes to the apps that make it onto the App Store. On the other hand, Android gives developers a lot more liberty, so the onus is really on the developer to bring their app in line with current security protocols. The same goes for developers on open-source IoT platforms.

What do you see for the future of mobility?

Mobility is the next big wave. This is an age of convergence where the applications we use every day, like fitness trackers or music apps, are all found on the same mobile device. And because everything is converging in a smaller space, there's definitely a need for security on the mobile front. Mobile devices may not be a significant source of data breaches now, but that doesn't mean that it will never be.



PHOTOGRAPHY ZAPHS ZHANG ART DIRECTION KEN KOH



While there may have been an uptick of malware targeted at mobile devices, Verizon's 2015 DBIR found that just 0.03% of mobile devices – out of tens of millions of them – are infected with malicious exploits.



Lamp free for a brighter future

TOSHIHARU OKIMURO
EXECUTIVE OFFICER AND GENERAL MANAGER,
DIGITAL SIGNAGE DIVISION, GLOBAL MARKETING HQ
CASIO COMPUTER CO. LTD.

by Ng Chong Seng

Many people have a bad impression of LED projectors, and often associate them with low brightness and poor performance. How is Casio different?

Let me first state that Casio's projectors don't just use LED. Instead, we employ a laser and LED hybrid system, which makes use of red LED, green phosphor, and blue laser, to produce light in different colors.

Casio's laser/LED hybrid projectors are lamp-free, which means they require little to no maintenance after installation. They also start up fast. More importantly, they have an average lifespan of up to 20,000 hours, ten times longer than traditional mercury lamp-equipped projectors. All these reduce total cost of ownership.

Adopting a laser/LED hybrid method also means our projectors can have benefits that usually only expensive pure laser projectors enjoy, such as high brightness. Our projectors don't run as hot and consume less power too. For example, a typical pure laser projector generates 492W; our new (lamp-free hybrid) XJ-V1 only generates 120W. Not to mention it's smaller in size and costs much less.

How did Casio come up with such an affordable lamp-free hybrid projector?

For the XJ-V1, we're able to gain the support of SSI (solid state illumination) vendors, as they share the same lamp-free vision like we do. Along with economies of scale and drops in production cost, we're able to achieve a price of \$999 for the XJ-V1, making it the cheapest lamp-free projector of its class in the market right now.

Of course, at \$999, some may still think that it costs more than a mercury lamp-based projector. But we've to remember that the XJ-V1 lasts up to 20,000 hours. If you're using a lamp projector, you need to change the lamp at least four times to get that number of hours. In the long run, our hybrid projectors are definitely more cost effective.

So, the XJ-V1 isn't a one-off?

No. The XJ-V1 is a door opener. The series will continue, and we've plans to expand the lineup.

Seriously, do Casio's hybrid projectors really last that long?

Yes, they do. Apart from our own test results, we've also heard of good results from real-world use cases.

For example, in Hong Kong, there's a traffic control center that uses projectors to project live images on a screen for monitoring. After using a projector that required lamp change every 2,000 to 3,000 hours, they decided to change to a Casio hybrid projector after hearing its advantages. Last I heard, the Casio projector has been used 24/7 for 15,000 hours and it's still projecting.

How is Casio going to make money if the projectors last so long?

We're seeing more and more people replacing lamp-based projectors to lamp-free projectors. To us and system integrators, that itself presents a huge business opportunity.

With Casio is focusing on consumers, could we be seeing hybrid pico projectors soon?

If you look at Casio's development history, you'll notice that one of Casio strong suits is miniaturization. We don't rule out making pico projectors; but right now, our focus is the XJ-V1 and its markets (education, SMEs). Trust us, for any new products, our approach is always to think about how it (can) differentiate from the rest in the market.




With a lifespan
of up to
20,000 hours,
Casio's lamp-
free hybrid
projectors
are definitely
more cost
effective than
lamp-based
projectors in
the long run.



MAPPING THE WORLD WITH 3D LASERS

by Koh Wanzl

 A UK company called ScanLab Projects is utilizing large-scale 3D laser scanning to produce detailed reproductions the world, ranging from ice floes in the Arctic to the mile-long stretch of Normandy's beach.

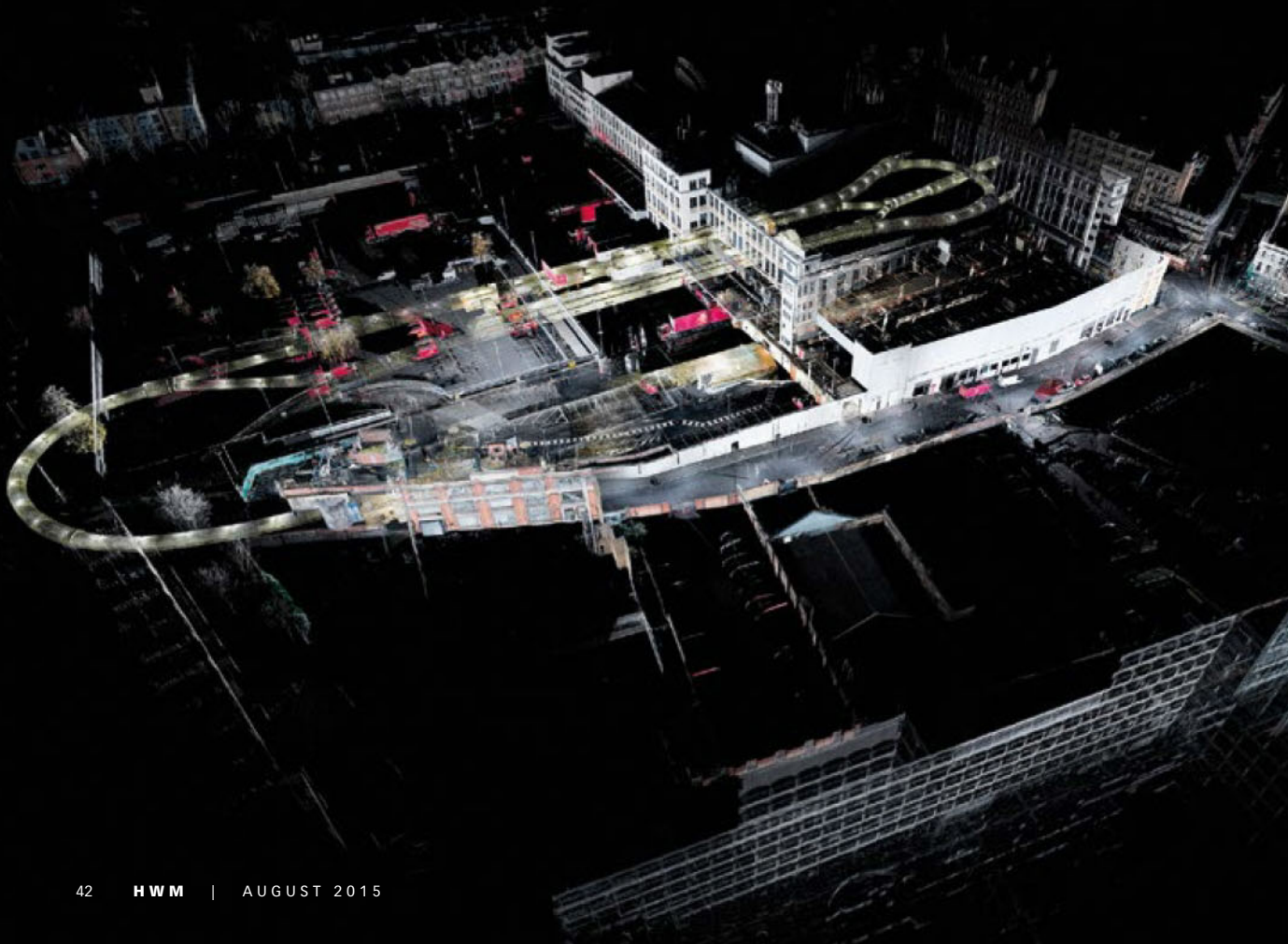
The technology they rely on is called Lidar – a portmanteau of “laser” and “radar” – that combines the two technologies to produce millimetre-precise ethereal images of natural landscapes and man-made structures.

The scanner works by sending an infrared laser out at the target, waiting for its reflection, and then measuring the distance to a specific point. It does this millions of times a second, and the

measurements all come together to form a point cloud, which is essentially a high-resolution 3D image of a place, surface, or object.

ScanLab Projects used Lidar to capture the entirety of London's underground Mail Rail, playing a key role in efforts to preserve it before it is converted – and consequently irreversibly altered – into a postal museum and public ride.

By capturing the real world in unprecedented detail, Lidar could empower new experiences both real and virtual in the present, and allow future generations to access experiences that have since been lost to them.



PICTURE SCANLAB PROJECTS

FEATURE

UPDATES FROM THE BIG THREE

Text by *James Lu & Ng Chong Seng* Photography *Vernon Wong* Art Direction *Ken Koh*



Microsoft's 3rd Vision

Let us explain why Windows 10 won't be a dud like Windows 8.



he Windows 10 proposition

If Microsoft CEO Satya Nadella could dial back the clock, he would have made sure that Windows 8 didn't happen. A reaction to the decline of the PC industry mixed with the illusion that it has finally figured out mobile, Windows 8 was in every sense of the word a disaster.

Then came the patchwork that was Windows 8.1. That and subsequent minor updates tried to pacify critics and stem the flow of users running away from the platform, but the damage - a very heavy one, might we add - was already done.

But the best thing about time is it's never too late to fix things. Steven Sinofsky, who was in charge of the mess that was Windows 8/RT walked in late 2012, as did now-former CEO Steve Ballmer in early 2014. Nadella took over and immediately started fixing - not the product but the vision.

A press briefing when he first took over and a couple of company-wide emails later, it's pretty obvious that Nadella's vision of harmonizing the needs of both individuals and organizations isn't that far off from Ballmer's. But Nadella's execution is different. Instead of devices and services, Nadella's Microsoft will focus on being a productivity and platform company in this mobile-first, cloud-first world.

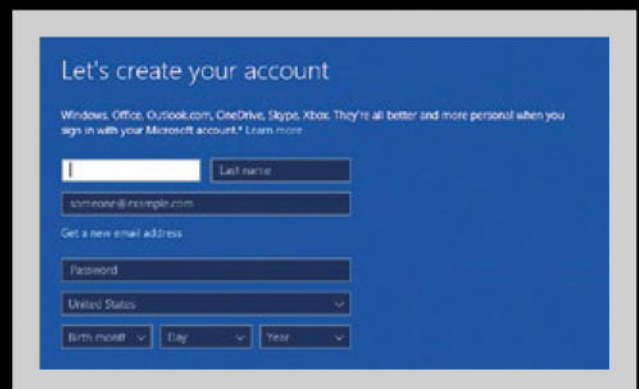
In fact, the wheels of change are already in motion. Office, another of Microsoft's crown jewels, is already on iOS and Android. Used to doing everything on its own, the company is also not shy now to turn to small, third-party apps to shore up mobile experiences it is weak in (e.g., the recent purchases of Acompli, Sunrise, and Wunderlist). Azure, Microsoft's platform-agnostic cloud platform, has been adding new features every other day, along with the strongest developer charm offensive (see: anydevanyapp.com) we've witnessed in years. And then there are all these new collaboration/productivity-type services and hardware that have come out of Redmond in recent months, like Delve, Sway, Surface Hub, and HoloLens.

But, where do all these leave Windows?

The best place to experience Microsoft services

In the past, Windows was a must-have because you needed it on your PC to run your apps. While this still holds largely true today, with the advent of mobility and the internet, people are moving away from the traditional method (desktops, local apps) to get their things done. Making its own devices augmented by its own cloud services, a strategy adopted by Ballmer, is one solution; ensuring experiences that move across devices, one that Nadella is pursuing currently, is another. And the latter has a profound impact on Windows moving forward.

With Windows 10, Windows is trying to get its sexy back, even if that means it needs the help of other Microsoft services. For example, if you sign in to Windows 10 with your Microsoft account, regardless of device, your files are immediately at your fingertips thanks to OneDrive syncing. The same goes for your work documents, as Office defaults to saving files in OneDrive. You may not understand how these bits flow in the ether, but you'll certainly remember the positive experience. This is the stickiness Microsoft is looking for in Windows 10, and the reason why the company is pouring time and money into its datacenters and cloud products.



The best place to experience Microsoft innovations

Sure, Microsoft's new strategy means you don't really need Windows to experience the company's services; but we'd argue that you need Windows to get the best out of them.

Cortana is a good example. An intelligent personal assistant that debuted in Windows Phone 8.1, it's coming to PCs and tablets (and Xbox One) as well, as Microsoft sets out to unify the OSes of its various product families with Windows 10. Accessed through the search button in the taskbar or when you call out her name, you can use Cortana to set reminders, add appointments, get directions, search the Internet, and more.

In the office, Cortana turns from butler to secretary. That's because Cortana in

Windows 10 also integrates with Office 365 for businesses, so it can do things like proactively help you prepare for an upcoming meeting, surface helpful information about the people you're meeting with, recent documents they've worked on, and reminders about when and where you need to be next.

Let us put it this way: it's perfectly fine for Microsoft if you use Windows 10 not because you like the OS, but because you enjoy the products and services that run on the OS. While it's true that Cortana is coming to iOS and Android, because that's released in the form of an app, it's highly unlikely to be as integrated into Apple's and Google's mobile OSes like Cortana is on Windows, and this puts a cap on Cortana's true potential.

Familiarity breeds happiness

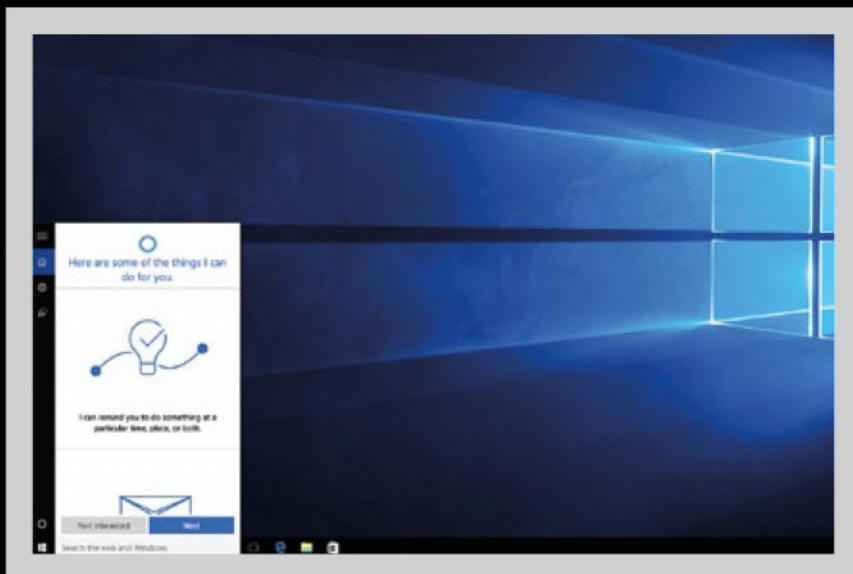
Of course, Microsoft wants you to love Windows 10 the OS too. According to Microsoft's OS chief Terry Myerson, Windows 10 "gives the familiarity of Windows 7 with some of the elements of Windows 8", a tacit admission that Windows 8's major UI shift was a bridge too far.

In Windows 10, the tile-laden, full-screen Start screen won't be forced on you if you're using a PC. More importantly, the Start menu has returned with a new look and newfound powers. While it looks a bit different from the one in Windows 7, it has all the usual features you'd expect, including a classic list of most used app shortcuts and power options on the left. And on the right, there's space to populate tiles, just like the Windows 8 Start screen. You can customize this new Start menu (resize it, change its color, rearrange the tiles) to your heart's content.

Familiarity in apps is also a central theme in Windows 10, and rightly so when you consider OS will run on small-screen Windows phones all the way to giant-screen office collaboration devices like the 84-inch Surface Hub. You know you're in friendly territory when you see universal apps (i.e., Windows Store apps) run in windows on the desktop, and them scaling predictably as you move from one device to another. Especially if you're using a computer-tablet hybrid, the new Continuum feature will ensure that the UI adapts according to the mode you're in.

And then there's Microsoft Edge, the new default web browser in Windows 10. While it will ship alongside Internet Explorer 11 on Windows 10, Edge is the favored son moving forward. It's optimized for modern websites

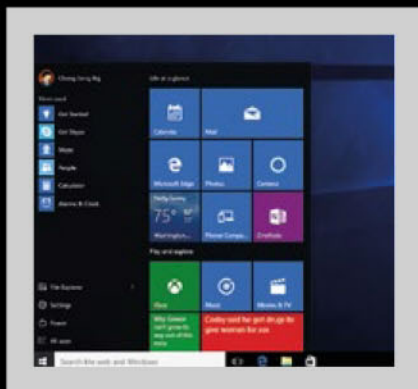
PICTURE: MICROSOFT



TO REITERATE, MICROSOFT IS MAKING WINDOWS 10 AVAILABLE AS A FREE UPGRADE FOR QUALIFIED WINDOWS 7 AND WINDOWS 8.1 (INCLUDING WINDOWS PHONE 8.1) DEVICES.



and standards, fortified with security measures, and decked with useful features like a note-taking mode, a distraction-free reading mode, offline reading support, cross-device syncing and Cortana integration. In fact, we wouldn't be surprised if most users don't realize that it's not IE, because its lowercase 'e' app icon looks devilishly similar to IE's icon if you don't pay

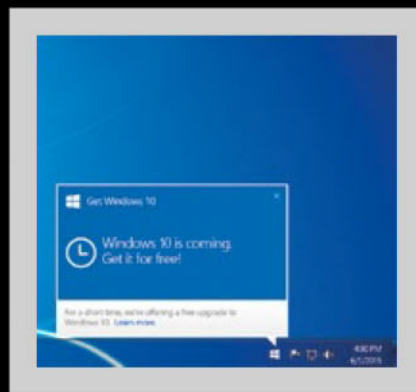


How Microsoft unifies Windows

While Windows 10 will run across all device families, there are still different versions for different devices. For example, the July 29 launch is for PCs and tablets. Why?

With Windows 10, what Microsoft has done is to put core OS components (e.g., the base OS, drivers, runtimes, and frameworks that are applicable regardless of devices and form factors) into a common platform. But Microsoft can only standardize that much. Since each device type inevitably has its own specific components, or specific functions and experiences it wants to achieve, Microsoft still needs to marry this common core with device-specific portions.

That said, it's this common core that makes it easier for Microsoft to continuously update and tweak Windows 10 for the supported lifetime of the device. Factor in the free upgrade offer, it's time for us to stop thinking of Windows as an OS, but as a service.



attention.

A change that's for the better and yet feels familiar to the users - that's Windows 10 in a nutshell.

Upgrade? Yes!

To reiterate, Microsoft is making Windows 10 available as a free upgrade for qualified Windows 7 and Windows 8.1 (including Windows Phone 8.1) devices. The catch is that this upgrade offer is available for only one year from the time Windows 10 is available. With Windows 10 (for PCs and tablets) launching on July 29, 2015, this means you've until end July, 2016 to take advantage of this offer.

By the time you read this, Windows 10 for PCs and tablets would have arrived. If you've a qualified Windows 7 and Windows 8.1 system and have reserved your copy through the Get Windows 10 app, you should have received or would be receiving a notification when the OS is ready to be installed.

Do it? Do it.

9



Apple's Newest Challenge

Apple's annual Worldwide Developer's Conference (WWDC) is traditionally a place for big OS and software announcements rather than new product launches, but that doesn't mean there wasn't news to be excited about.

i

OS 9

The newest version of iOS doesn't have any major outward changes, focusing instead on design polish, refining some of the rougher edges and adding useful new features. Apple also said it wanted to improve the "foundations" of the platform including improving battery life, adding "intelligence"

and improving the iPad experience.

Apple's digital assistant, Siri, is now more "proactive", and will offer suggestions based on context such as time of day or location, very similar to what Google Now currently does. For example, Siri will automatically tell you how far away your next appointment is based on traffic or, if you like to play music in the morning, she will pick up on that pattern and automatically start suggesting music for you around the same time every day. New and improved Siri is also better at understanding natural language and can return better search results.

New to iOS 9 is Apple's News app, which will aggregate news content from a variety of sources. Articles are presented in a mobile-formatted layout that loads quickly and has informative animations and full-bleed images. Apple has partnered with a number of news organizations to provide content for the new app, such as CNN, Time, Wired, and ESPN.

The app can also display articles from any web link, but Apple

says the best experience is with those that have been built specifically for the app. News looks very similar to Flipboard and a variety of other mobile reading apps that have been in the App Store for year but Apple claims that the difference is News will learn from user usage, and will suggest content and articles based on what you prefer to read.

iOS 9 also includes some upgrades to some older apps. Notes is getting some new features, such as image insertion, checklists, and sketches, and Apple Maps is getting support for public transport directions, showing train and bus routes.

The iPad also received some specific upgrades with iOS 9, including a new multi-tasking feature called Slide Over that lets you swipe apps in to the same screen with both apps remaining fully active on the screen at the same time. Apps can be split 50-50 or 70-30 on the screen, and the iPad's existing multi-finger touch gestures work on either side.



At a system level, Apple says iOS 9 is more efficient and smaller than ever. The new software only requires 1.8GB of free space to install, which is much less than the 4.6GB iOS 8 needed. Apple also says iOS 9 has a new "low power mode" that can squeeze another three hours of battery life out of a single charge.

iOS 9 will be available in September when the new iPhones are launched. All iOS devices capable of running iOS 7 and 8 will be able to upgrade to iOS 9.



Mac OS X El Capitan

Apple continues its pattern of releasing free Mac OS X annual upgrades, which add new features without completely overhauling the system every year, with Mac OS X 10.11, named El Capitan after a rock formation inside Yosemite National Park. El Capitan focuses mainly on improved user experience and performance.

The Safari web browser has received a few updates, including an icon on each tab that will show if that tab is playing audio (something Google's Chrome browser has had for years). Mission control has a few new features like tabs for pop-ups in fullscreen apps and a split view mode for multitasking. Spotlight has also received an

update, and you'll now be able to use contextual real world language to search for what you want. For example, you can search for 'mail I ignored from [specific people]' and only be shown un-replied to messages.

Apple is also bringing its Metal API to the Mac, having first introduced it on iOS last year. It supplants OpenGL for graphics rendering, offering up to 50 percent faster graphics rendering performance.

On the performance front, El Capitan is said to open apps 1.4 times faster, app switching will be twice as fast, and PDF files will open up four times faster in the Preview app.

OS X El Capitan will roll out as a free upgrade to all Mac users later this year.

Apple watchOS2

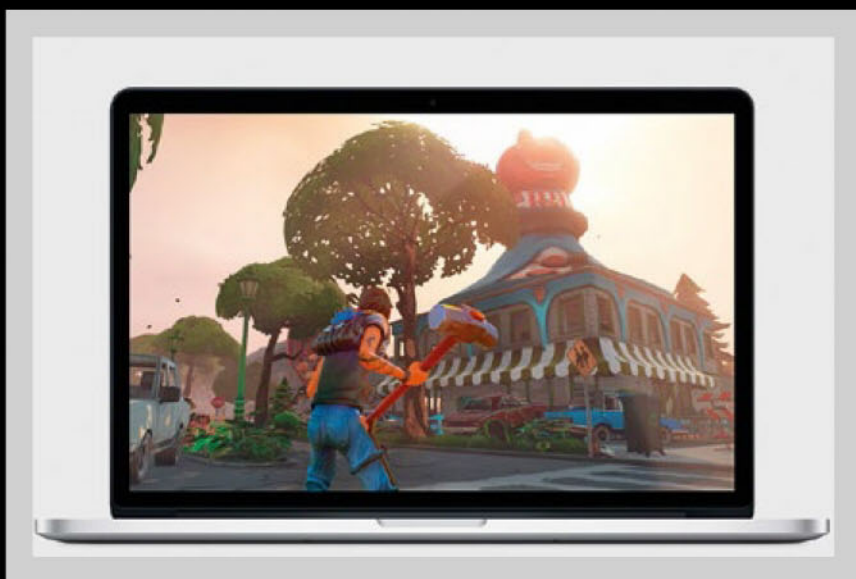
While it's only just launched, Apple has already announced an updated version of watchOS for its Apple Watch wearable. Developers will now be able to make native applications for the Apple Watch. That means better and more capable apps you can use when you don't have your phone with you. Most of this is thanks to the newest version of WatchKit. While software developers previously had to modify iPhone software for the Apple Watch screen and let the iPhone do most of the work, developers will now gain greater access to the watch's hardware features, like its microphone and speaker, accelerometer, Taptic Engine, and Digital Crown.

The logic for watch apps previously ran on the iPhone, but watchOS2 allows it to be moved to the watch itself. Third-party developers can now create apps that run natively and perform better, which means they'll load more quickly and be able to fully utilize the watch, like current Apple-made apps Maps and Mail.

Users will also gain new options to really customize their watch face and make it their own. Now you can pick an image from Photos and set it as your watch face, or even set a different image from any album to appear every time you raise your wrist. Given the amount of customizability that users are used to on their smartphones, this feature feels really long overdue and we're glad it's here now.

Then there's Time-Lapse, which allows you to choose to display 24-hour time lapse videos from iconic cities and scenic locations around the world as your watch face. Fancy, but it remains to be seen how, or if, it will affect the battery life.

PICTURE APPLE



**"WE'VE HAD A LONG
RELATIONSHIP WITH
MUSIC, AND MUSIC HAS
HAD A RICH HISTORY OF
CHANGE, SOME OF WHICH
WE'VE PLAYED A PART IN."
- TIM COOK**

Apple has also added new ways for you to modify your watch face with useful information from third-party apps. Apple has dubbed these nuggets of information as "complications", a clear nod to more conventional analog watches, the more extravagant of which can display things like your speed to the phases of the moon.



WatchOS2 lets you do something similar, but with far greater flexibility. Perhaps you're on a jet-setting journey that involves crossing the country several times in a matter of days? You can now keep track of flight times right from your watch face. But if you've returned home and want to always monitor the charge in your electric car's battery, you can switch to doing that too.

The Digital Crown also gets a new feature in the form of Time Travel, which lets you fast-forward or rewind by up to 72 hours to see things like upcoming events and the weather or recap the past few days. And if you're the sort that only takes off your watch just before you go to bed, the new

Nightstand mode should serve you well. Placing your Apple Watch on its side and charging it now sends the watch into Nightstand mode and transforms the Digital Crown into a snooze button. The side button is then used to turn off the alarm.

In addition, watchOS2 finally lets you reply images directly from the watch itself. It works similarly to the way you could previously reply to a text message – via voice dictation, emojis, or smart responses. WatchOS2 will be available as a free update for users later this year, and will work on every version of the Apple Watch.

Apple Music

Apple's "One more thing..." at WWDC 2015 turned out to be Apple Music, the long-rumored music service that follows Apple's acquisition of Beats last year.

Beats co-founder, Jimmy Iovine, revealed Apple Music and introduced a few of its key features. Iovine says that "tens of millions" of iTunes songs will be available for streaming or saving for listening offline and, like Spotify and other music streaming apps, Apple Music's For You feature will offer recommendations based on your listening habits too. Where Apple Music differs is that, instead of using some computer algorithm to find something you may like, experts "who know and love music" will instead serve up the suggestions.

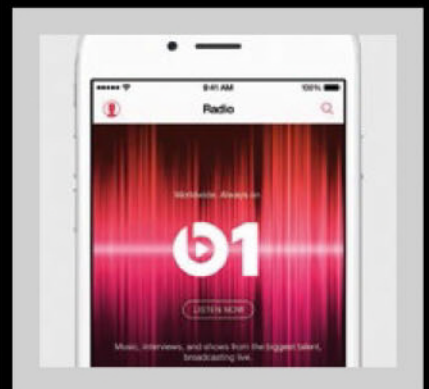
In addition to music streaming, Apple Music will also play host to a number of 24-hours a day radio stations hosted by big name artists like Dr. Dre, Will.i.am, Pharrell, and Drake acting as DJs, as well as established radio DJs. The first radio station will be called BeatsOne and will be available in 100 countries, and will be anchored by

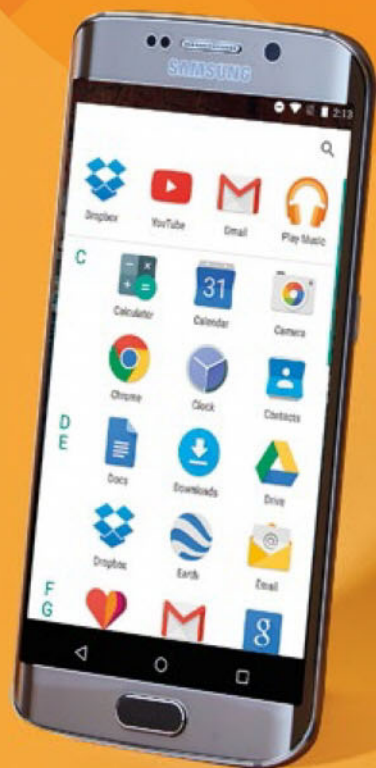
three DJs: Zane Lowe, Ebro Darden and Julie Adenuga. Subscribers can skip as many tracks as they like.

For artists (both signed and unsigned), Apple Music's Connect feature is a bit like a blog where they can post tracks, tour photos, new material and more, giving fans a glance at what's going on behind the scenes.

As for the app itself, when you open it up, it will display all of your recently added songs for quick and easy access. Tap a song to start playing it, and tap again to browse iTunes for other albums/songs from the artist. Apple Music will also support music videos. It also has Siri integration, with natural language searches, so for example, you can ask her "play the number 1 song from December 2000" and she will find it for you.

Apple Music is available now with a free 3-month trial, after which, users will be automatically billed \$9.98 for individual membership or \$14.98 for a family plan that can be shared by up to six people. Android and Windows versions, as well as an Apple TV version, will be coming later this year.





Google - Polish, Photos and Pay

Google I/O 2015 may have lacked the blockbuster devices announcements and transformative tech for which the conference has become known in recent years, but Google still had plenty to announce.

A

Android M

Android M is the next version of Android OS. While its full name is still to be revealed (we're hoping for Marshmallow), we do know that M is focused on "polish and quality" with Google Senior VP Sundar Pichai saying, "we've literally solved thousands of bugs."

On top of bug fixes, Google has identified a number of key areas of improvement in Android M. The first of these is how Android handles App Permissions. With M, apps will make it clear to users whether the app needs to use the camera, location data, or other information about a user and their device. Previously apps would ask upon installation for permission to each of the features it might possibly require. In Android M users will be able to see which apps use which elements of their devices more easily, and decide if they want to revoke that permission in a more granular way.

Next up, Google is introducing a way for developers to use Chrome as the core of an in-app web browser, rather than having to build a separate browser (which lacks access to the other features of Chrome). This should be able to make it faster and easier to use the web in apps across your device.

Google is also introducing improved app links, which will make it easier for apps to indicate which links to open in which apps. This nuanced update allows Android to know to send a user to the

Twitter app, for instance, when a Twitter link is clicked, rather than presenting a list of possible apps to open.

Following the success of Apple Pay, Google will also be introducing its own version of Apple's integrated mobile payments system, unsurprisingly called Android Pay, with a focus on "simplicity, safety and choice". It uses NFC and Host Card Emulation for tap-to-pay services and will replace the current Google Wallet app. Like Apple Pay, your credit card data is not shared with stores on payment - rather it uses a different ID number to verify the payment. It's launching in the US first, of course. No word yet on when, or if, it will spread to the rest of the world.

Tying in with Android Pay, Google is also standardizing fingerprint sensors in Android, much like TouchID in Apple iPhones and iPads. Fingerprint sensors have been seen in many Android-based phones, but the user experience has varied, and has often been underwhelming. The new API also brings access to the fingerprint sensors to app developers - meaning better and swifter verification for apps of all kinds, not just Android Pay.

Finally, Android M will provide a big boost to battery life and charging times. Android will be "smarter about managing power", draining the phone less when not in use with a core feature called Doze, which lets the system manage background processes better. It relies on motion detection to determine when someone is using a device, and shuts down processes when activity hasn't been detected for a period of time. According to Google, Doze can extend the standby time of a Google Nexus 9 tablet by up to two times over Android Lollipop. Android M also introduces native USB Type-C support, which allows for faster and easier charging thanks to its reversible design and higher maximum power load. The Android M Developer Preview is available to download now and will be available to consumers in Q3 2015.

Project Brillo

Other than acquiring connected home company, Nest, last year, Google has been fairly quiet on the Internet of Things front, but that changed at Google I/O with the announcement of Brillo. Essentially Brillo is an OS designed specifically for IoT devices. Brillo is derived from Android, running on the same core of drivers and code, but 'scrubbed down' to the bare basics (thus Brillo, like a Brillo Pad), so that it can run on everything from smart locks to light bulbs.



PICTURE GOOGLE

On top of this layer, Google is rolling out “Weave” a “common language” communication protocol for devices to talk to each other, to the cloud and to your smart devices. The aim is to standardise devices on the IoT, across different platforms, and let developers build apps on top. Brillo will be available to developers in Q3 2015.

Google Photos

Google also launched a new and revamped Photos app at Google. The app aims to improve how you store and organize your huge photo collection. Best of all, it comes with unlimited storage for all your high-res photos and videos. Yes, unlimited. To be entirely clear, resolution is limited to

16-megapixels for photos and 1080p for videos, but when it’s free, who’s complaining, right?

Along with storing your photos, Google Photos’ other big feature is organization. Photos will analyze your images and automatically sort them into groups. Photos will analyze your images and automatically sort them into groups. Director of Google Photos, Anil Sabharwal, demonstrated how the app could distinguish and sort photos of specific scenes, like city skylines or beaches, and it’s also pretty good at identifying people, so that you can scroll through images of them over time. It will even track them as the age, so photos of your child will appear all the way back to when they were just born, even if they look nothing like they did when they were a baby, now.

Sabharwal also demonstrated how you could search for specific moments in photos. For example, looking up “snowstorm in Toronto” will show images of snowy days in that location.

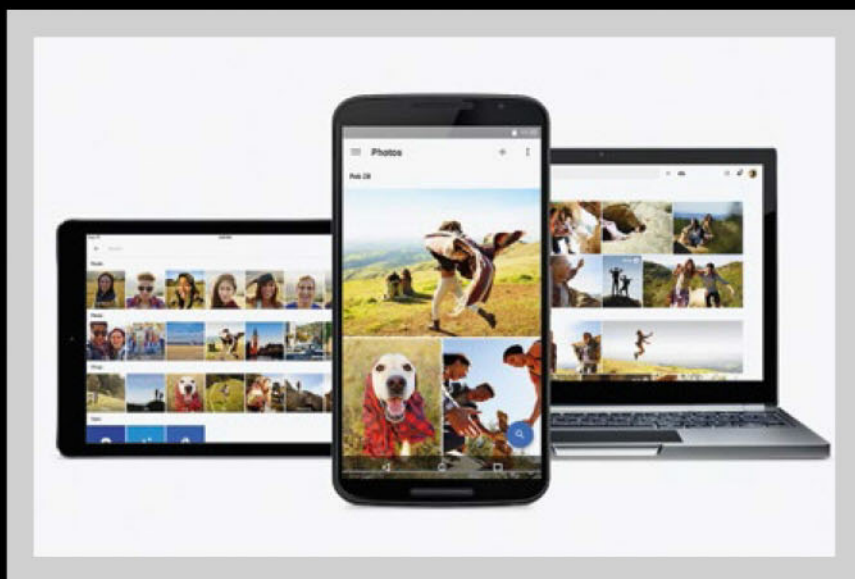
Google is also trying to make sharing photos a bit easier. The app will allow users to share groups of images without requiring the recipient to have the app - it will make a web gallery that they can view.

Google Now On Tap

In its quest to “make the smartphone smarter”, Google said it wants to help users to assist them wherever you are on your phone. The new “Google Now On Tap” will let Android M users make searches, in context, within apps. For example, if you’re listening to Andrew WK, and say “OK Google, what’s his real name”, Now will pop up and tell you “Andrew Fetterly Wilkes-Krier” (yep, that’s his real name). It will also give you contextual information just by holding the home button on your phone. In another example, Now will know if you’re reading a message about going for dinner at a restaurant, and give you information on demand about where you’re going to eat.

Google’s short and long term plans for Virtual Reality

Google has been quite active in the virtual reality space, last year unveiling Cardboard, a decidedly low-tech headset that used your smartphone, two cheap lenses, and \$1 worth of corrugated paper to provide a virtual reality experience. Since then there have been more than 1 million downloads of the Cardboard virtual reality app. This year, at I/O, Google unveiled a new and improved version of Cardboard that is just as cheap as



PICTURE GOOGLE

ALONG WITH STORING YOUR PHOTOS, GOOGLE PHOTOS' OTHER BIG FEATURE IS ORGANIZATION. PHOTOS WILL ANALYZE YOUR IMAGES AND AUTOMATICALLY SORT THEM INTO GROUPS.



the original, but accommodates phones and phablets up to six inches. The new version also has an improved button, and will support iOS as well as Android.

Right now, the only drawback to Cardboard is that there's not much compatible content available, but that may soon change with Google's two newly launched initiatives. First up, Google has announced it is financing a program called Expeditions that is designed to insert virtual reality into the classroom. From a single control panel, a teacher will be able to lead a class of Cardboard wearing students on a virtual field trip to the Moon, the Great Wall of China, or even the bottom of the ocean. So far, The Planetary Society, the Chateau de Versailles, and the American Museum of

Natural History have all signed up to release virtual tours later this year.

Next is Jump. If Cardboard is the low-end budget-side of virtual reality, Google's new Project Jump is the big money version. Jump is a new camera system that will enable "any creator" to capture VR video. The system has a specialized camera rig, software to translate the video and a player to distribute the videos. The aim is to increase the variety and type of images and videos available to view through VR systems and Google ultimately hopes that Jump will become the standard for capturing, assembling, and viewing immersive virtual environments. Crucially the system is able to create 3D effects automatically - allowing the sensation of

depth and truly realistic images, rather than 2D videos stitched together artificially. There are two components to Jump: the camera and the Assembler. GoPro has already announced that it will be the first company to build a Jump-compatible rig - basically a 16-camera wheel that captures 360 degrees of imagery. Google Assembler then takes that imagery, calculates dead spots and depth, and layers all of them into one contiguous video experience. The stereoscopic video will then be distributed on YouTube. All Jump content, of course, will be compatible and viewable with any \$20 Google Cardboard viewer.

The GoPro rig is likely to be very expensive, but Google says that a less expensive version could be possible, as any properly configured collection of cameras should work with Jump. "We've made one out of 3D-printed plastic, one out of machined metal, and for good measure, of course, we also made one out of cardboard" said Clay Bavor, vice president of product at Google. **HWM**



STAY SAFE WITH THESE GADGETS

by Koh Wanzi

■ We're so concerned about cybersecurity these days that we end up overlooking the importance of protecting our physical belongings. Fortunately, technology is good for more than just creating fancy new baubles. These gadgets make use of tech to help secure your devices, and yourself in the real world.



KENSINGTON CLICKSAFE PORTABLE COMBINATION LAPTOP LOCK

WWW.KENSINGTON.COM

Given how slim and compact laptops are these days, it's probably all too easy to have yours filched. Protect Kensington-compatible notebooks or devices with this keyless four-wheel combination lock that has 10,000 possible combinations. Its ClickSafe Security Anchor attaches easily to any Kensington Security Slot, while its push button design allows for easy one-handed operation. The self-coiling 6-inch cable shrinks to 3-inches for easy packing, so you should have no problem taking the lock around with you.



THUMBSUP! SPY CLOCK WWW.THUMBSUPUK.COM/

Now here's something out of a 007 movie. If you don't want to install a conspicuous IP camera at home, this clock records videos, takes photographs and even sports a motion and sound detector. Clad in a stainless steel finish, it features an adjustable stand and does regular clock things like telling the time. When the clock is done snooping, you can upload files directly to your PC via a USB cable. The camera lens is set discreetly in the clock face itself, and you can add up to 8GB of capacity via an onboard micro SD card slot.



DOOR WEDGE ALARM WWW.CAROLWRIGHTGIFTS.COM

Anti-virus software, personal firewalls and anti-spam filters. You probably have one, or all of these tools as frontline defense to cyberattacks. But what about physical intruders? A door wedge alarm is actually a great early warning system and additional security, especially when staying at public places such as hotels. The device will set off a loud 120db alarm if anyone has the effrontery to force their way through your door without so much as a by-your-leave. It is powered by two AA batteries and easy to pack for travels.



SAFELET+
WWW.SAFELET.COM

Safelet+ is a safety bracelet that merges form and function into an elegant wearable. It works with a companion iOS or Android app that pairs the bracelet with your phone via Bluetooth. You can then invite family and friends into your guardian network. A panic signal is sent by simultaneously clicking the two buttons on either side of Safelet+. Your guardians – or optionally, the police – will then be alerted to your location via your phone. An onboard microphone will even record everything that's going on around you.



IWALLET CLASSIC CARBON FIBER
WWW.WALLETUSA.COM

Wrapped in a sleek black carbon fiber holder, the iWallet uses biometric fingerprint scanning technology to secure your cash and cards. So even if you lose your wallet, you'll gain more time to cancel your cards and report the theft, knowing that someone isn't off right now painting the town red in your name. It can also be linked to your phone via Bluetooth, and its construction prevents your RFID cards from being scanned without your knowledge. And at just 196g, it sure is easy to pocket!



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has changed, but
our connections
stay the same.

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TEST

LAB RESULTS

Every month behind the doors of our super secret gadget testing facility, the latest tech products are put through their paces using industry recognized benchmarks and our own blend of real world usage scenarios. Here are our findings.

MORE INSIDE >

NETGEAR ARLO

The mobile, wireless and sticky IP cam.

AFTERSHOCK TREMOR

Pre-built DIY PC?

JABRA BOOST

More stamina than you have things to talk about.



HOW WE RATE:

Products are rated on a scale of **1** to **10**; **1** being so abysmal, it should be a crime to sell it, and **10** being almost perfect. Come now, nothing is perfect. An Editor's Choice may also be awarded based on unique merits.





SIZING DOWN THE PROS

The latest mirrorless cameras come with sensors and features that equal or even surpass their traditional DSLR cousins, all in a smaller form factor. Some even have prosumer functions like 4K recording. We put them to the test to determine which gives you the most value.

Text by *Marcus Wong*

Photography by *Zaphs Zhang*

Art Direction by *Ken Koh + Ian Chong*

VS

CANON EOS M3

•

NIKON 1 J5

•

SAMSUNG NX500

•

SONY A6000

CANON EOS M3

The EOS M3 is Canon's third attempt at a mirrorless camera to compete with the likes of Fujifilm, Panasonic and Olympus. It comes some three years after the original EOS M was launched in 2012. The second EOS M2 was only released to Japan and China, so it's interesting to see if Canon has finally brought their mirrorless offering up to par with this iteration.

The EOS M3 gets a new 24-megapixel APS-C sensor and Canon's new Hybrid CMOS III AF system, with a DIGIC 6 image processor to boot. Design-wise, the EOS M3 has a somewhat utilitarian design by today's standards, eschewing retro looks for a no-nonsense, functional approach. While the body certainly isn't as slim as a traditional mirrorless camera, the dimensions are certainly smaller. The added depth also allows for a deeper handgrip compared to the previous bodies, which makes for easier handling overall.

The top dials all feature a knurled finish, which gives them more of a tactile feel that's

always handy when you're trying to adjust settings without actually looking at the dials. There's a pop-up flash built-in, and you can add an electronic viewfinder to the standard hotshoe if you purchase the optional EVF-DC1 accessory (an additional \$379). If you have

existing EF-S lenses, you can also use them with the EOS M3 by using the mount adapter EF-EOS M (a \$179 purchase). This adds to the length of the overall package, but helps to mitigate the somewhat limited lens selection of the EOS M at the moment.

The on/off button is pretty nondescript, sinking into the main body of the camera, while the movie record and image playback buttons have also been sunk into the thumb grip. While it may seem like an awkward design choice at first, in practice remains pretty

accessible. Still, it does seem that Canon continues to gear the EOS M series towards entry-level enthusiasts, as functionality is kept simple with a menu doesn't give much options in terms of autofocus methods or continuous shooting frame rates.



Deep handgrip makes for easy handling.



Controls are too simplified for professional use.



AT A GLANCE

Sensor
APS-C CMOS

Resolution
24.2-megapixels

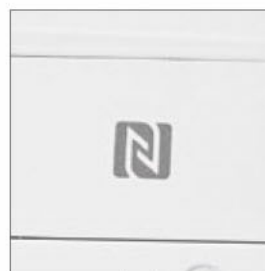
Dimensions
111 x 68 x 44mm

Weight (inc. batteries)
366g

Price
\$899.00
(with EF M18-55)



The mode dials are knurled for better feel.



The EOS M3's NFC spot is at the bottom of the camera.



An external EVF can be purchased for use.

NIKON 1 J5

The Nikon 1 J5 brings a slightly more rugged look than its predecessor, the Nikon 1 J4. It's also slightly thicker at 31.5mm compared to the J4's 28.5mm, largely due to the new handgrip design. Where the Nikon 1 J4 had a sheer, flat body that looked like your regular prosumer compact, the Nikon 1 J5 now sports an extended handgrip in the front, and a slight thumbgrip in the rear, bringing it more in line with prosumer camera designs.

The controls are now also much more accessible overall, thanks to the fact that the Nikon 1 J5's dials are raised up slightly now making them easier to access. This is especially so with the movie record button, given much higher priority in its new position at the center of the control dial, a move influenced by the increased importance and popularity for video functionality on still cameras.

Perhaps to account for the extra space needed for the larger buttons, the power

button has also been replaced with a spring-loaded switch that surrounds the shutter. The rear screen retains tilt and touch capabilities, but the camera now gains NFC for easier pairing to your smart device.

We must say that we like how Nikon has implemented touch with the J5. In Manual mode for example, your shutter speed, aperture and ISO value appears in boxes that you can touch to bring up dialog boxes to adjust them. That's always a handy option to have when you need to hold the camera away from your body to get shots from odd angles.

Internally, the Nikon 1 J5 gains a new 20.8-megapixel processor and a 1-inch BSI-CMOS sensor, thought it is still the smallest in this roundup. Nikon's also updated it with a faster Expeed 5A processing engine with the ability to

shoot 4K video, but only at a reduced rate of 15p. What is likely to be more handy though, is the ability to shoot at 120fps in Full HD for 4x slow motion playback.



Still one of the fastest cameras around with 60 fps.



Image quality starts to degrade from ISO 3,200 onwards.



AT A GLANCE

Sensor

1-inch BSI-CMOS

Resolution

20.8-megapixels

Dimensions

98.3 x 59.7 x 31.5mm

Weight (inc batteries)

231g

Price

\$709.00 (with 1 NIKKOR VR 10-30MM f/3.5-5.6 PD-Zoom)



The power button has been replaced with a switch.



The new layout makes it easier to access the movie record button.



A small pop-up flash is included in the body.

SAMSUNG NX500

The NX500 takes a lot of the plus points from the NX1 from last year and packs it into a much smaller, consumer-friendly body. It's the successor to the NX300 and so shares much the same design, with the main difference being that the front is now chamfered down slightly. The shutter button (along with the power switch) have thus been moved to a slightly lower plane to match, and Samsung has placed an AEL lock button alongside it.

The NX500 doesn't come with a pop-up flash, but rather a screw-in flash is provided that fits on the hotshoe mount. Two stereo mics are found on the top of the NX500 as well as a Wi-Fi button to quickly activate pairing with a smart device.

Unlike the NX300 before it though, the NX500 has two command dials, giving you more of a full DSLR experience, with one set to adjust aperture and the other, shutter. These are unfortunately a little on the thin side, and thus do not provide a nice firm feel. Still, when combined

with the excellent hybrid UI, changing settings is still pretty quick and easy.

Key to this hybrid UI is the fn menu that has been brought over from the NX1. Combined with the excellent touchscreen Super AMOLED rear LCD, the fn menu literally puts almost every setting available at your fingertips. Simply tap to select a function and use the scroll wheels to adjust its settings.

For the most part, the ergonomics of the NX500 are generally pretty good, with all the controls nicely spaced out. The one exception to this is the movie record button, which is embedded somewhat awkwardly in the thumb rest in the rear. It is completely flushed with the surface, and so can be tough to activate. That's honestly a little disappointing given that the ability to record 4K

video direct is one of the key features of this camera. Where the NX1 does a full 30 minutes of 4K recording though, the NX500 will only do 15-minute long segments, so you will have to plan your shots appropriately.



Most complete set of prosumer features.



Movie recording button is hard to activate.



AT A GLANCE

Sensor

APS-C BSI-CMOS

Resolution

28.2-megapixels

Dimensions

120 x 64 x 43mm

Weight

(inc. batteries)

287g

Price

\$1,159 (with 16-50 Power zoom)



The movie recording button is at an awkward location.



A small hotshoe flash is included with the NX500.



The convenient fn menu places everything at your fingertips.

SONY A6000

The Sony a6000 is the largest camera of this group, but that also makes it the easiest to grip. The wider body allows it to have its dials and controls further spread apart, and it does feel like the individual dial and knobs are substantially larger than the others too.

There's also plenty of allowance for custom function buttons, and it's nice to see that the mode dial and the main control dials are now separated instead of being layered upon each other like in the NEX-6. Overall, the camera feels extremely solidly built, and while it certainly isn't pocket-sized, it should fit handily into a small bag or carrying pouch.

One of the bigger changes in the a6000 that existing NEX users may notice is that the menu system is now the same as that found on the rest of the Alpha series; Sony finally making the decision to unify the user experience across both product lines. This is good news, as the Alpha menu is actually more straight forward to operate. Users will

essentially save on one level of menu diving and can get access to all settings without having to pull out to the main menu each time you want to go into a different category.

While the a6000 doesn't have touch capabilities, it's the only camera in this shootout to have a built-in Electronic

Viewfinder (EVF), and that's certainly useful in situations where bright light makes it hard to view the LCD. One thing we have found though, is that the eye sensor can be a little overly sensitive, switching to the EVF if your fingers get too close when operating the camera.

One thing to note is that while the a6000 has your usual USB and micro-HDMI ports (found on the left), it doesn't have a microphone port, so those looking to add video recording capabilities will be left with hotshoe mounted options only. You

may also be interested to learn that the LCD has a 16:9 ratio, which is great for video, but leaves black bars on both sides when shooting stills in 3:2.



Easiest to handle.



Menu system still takes the longest to navigate.



AT A GLANCE

Sensor

APS-C CMOS

Resolution

24.3-megapixels

Dimensions

120 x 66.9 x 45.1mm

Weight

(inc batteries)

344g

Price

\$1,099

(with SELP1650 lens)



The a6000's rear LCD only tilts up 90 degrees.



You can probably tilt the pop-up flash upwards with your finger for bounce flash.



The a6000 is the only one in this group with an EVF built-in.

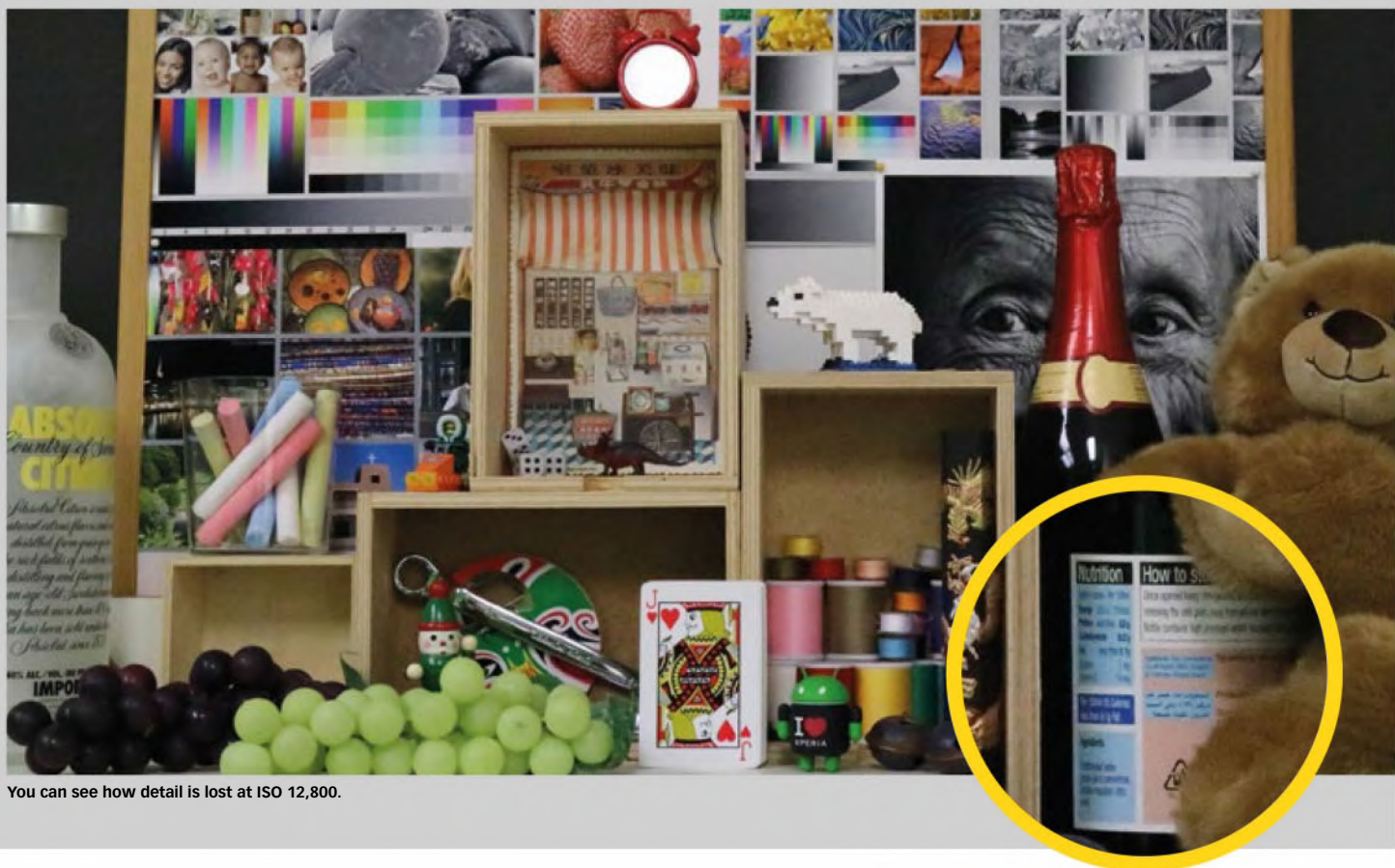
IMAGE QUALITY & PERFORMANCE - CANON EOS M3

While the EOS M3 certainly boasts improved handling as compared to its predecessors, we're sad to say that the autofocus speeds aren't quite up to par here. While the 1-pt AF is fairly fast and accurate in daylight, it suffers some in low light. The AF area is also too large, and doesn't allow for focusing on precise points; this lack of focus options can be frustrating during shoots.

Overall, we'd say the images from this camera are pretty good with a good amount of detail at the lower ISOs. You can safely go up to ISO 6,400 with this camera. That's when detail loss tends to set in due to the noise reduction algorithms kicking in. Automatic exposure seems to be accurate, but images tend to have more of a green bias compared to the others.



The EOS M3 gives nice, vibrant colors.



You can see how detail is lost at ISO 12,800.

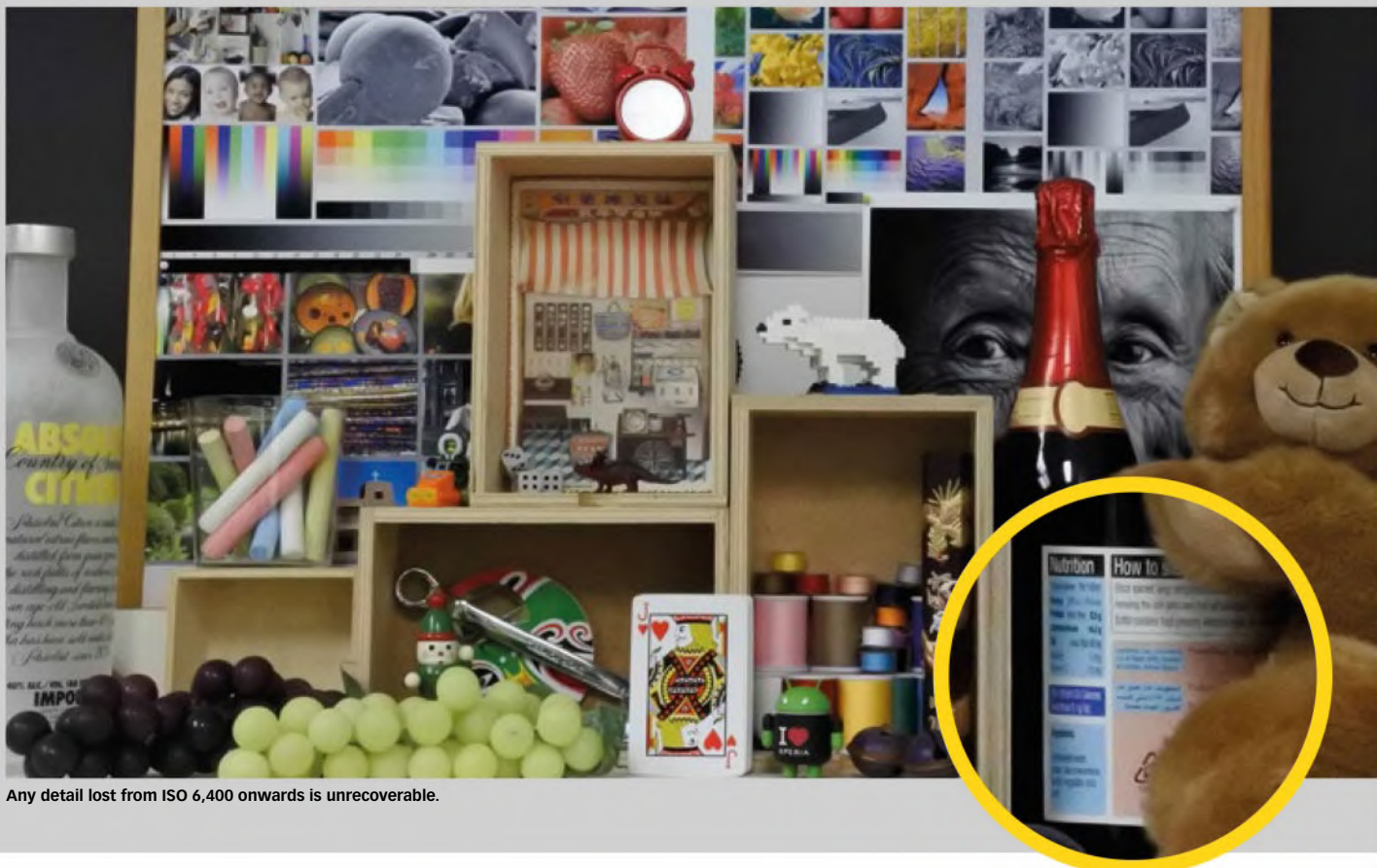
IMAGE QUALITY & PERFORMANCE - NIKON 1 J5

The Nikon 1 J5 is built for speed and it shows, with the camera being both fast to react in terms of focusing and getting focus. It does seem like it could benefit with a bigger memory buffer though, as we noticed quite a bit of LCD blackout in between shots.

Burst images are stored as a single group for review, and that's handy because the camera goes up to 60fps on continuous shooting, which would make selecting images a nightmare if you have consecutive burst shots. Images captured display good sharpness, though we have found that they can be prone to clipping on the high end. Noise starts to show at ISO 3,200, and becomes very evident at ISO 6,400 and onwards, so we'd recommend staying below ISO 6,400 for this camera.



There's good detail from the Nikon 1 J5 – just look at the lace on the goose.



Any detail lost from ISO 6,400 onwards is unrecoverable.

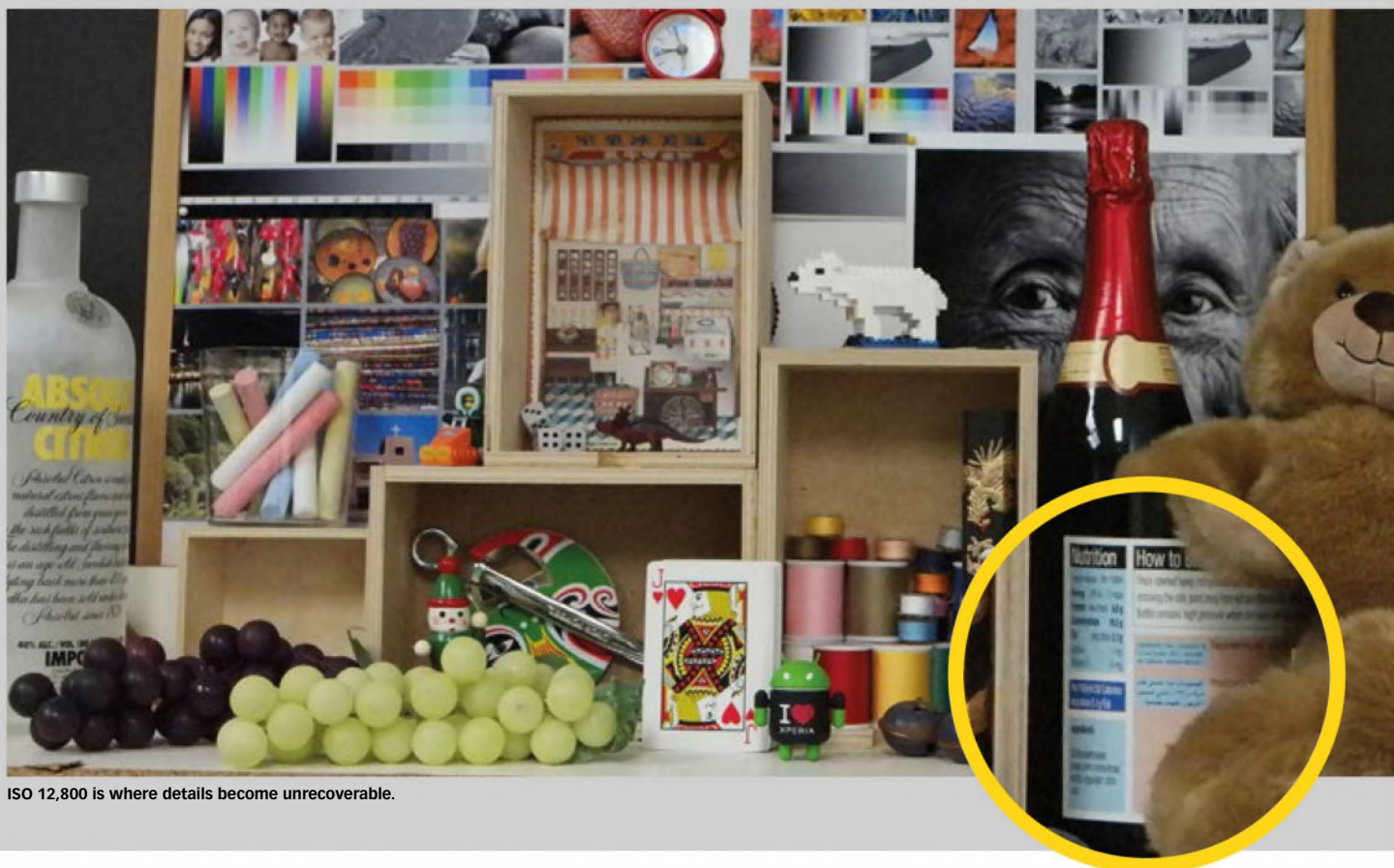
IMAGE QUALITY & PERFORMANCE - SAMSUNG NX500

The NX500 has the highest megapixel count of the group, so it's hardly a surprise to see that images captured from this camera display the most detail. Unfortunately, that's an advantage that only lasts up to ISO 6,400, as over-aggressive noise reduction algorithms mean that any extra detail captured gets reduced to mush at ISO 12,800 and over.

That's not surprising, given that the NX1 (from which the NX500 gains its sensor) exhibits the same characteristics. On the flipside though, the NX500 has the same fast, accurate autofocus as the NX1, and a fairly high burst rate for continuous capture at 9 frames per second, slowing down after approximately 40 frames in JPEG and 5 frames in RAW. Colors captured are quite accurate, needing just a slight touch of yellow for accuracy.



Even at ISO 6,400, there's an impressive amount of detail captured in the feathers.



ISO 12,800 is where details become unrecoverable.

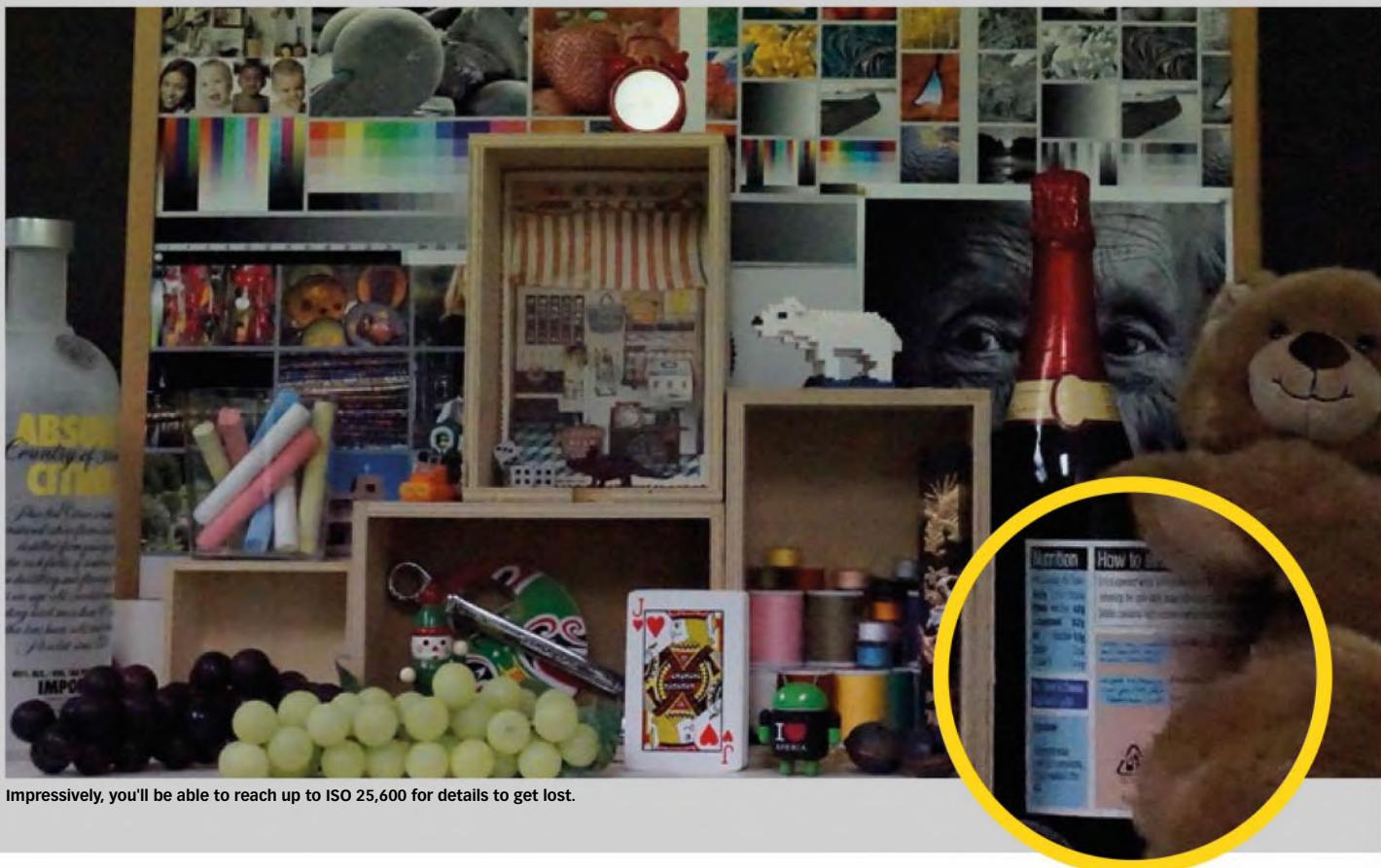
IMAGE QUALITY & PERFORMANCE - SONY A6000

The a6000 seemed to be the fastest camera of the group in terms of response time, and we were able to go from shot to shot with little letdown. There's very little lag with this camera, except for the time you spend fiddling with the buttons. While it doesn't hit the Nikon 1 J5's 60fps burst rate, the a6000 does a very respectable 11fps, which is on par with some professional cameras.

Images captured have good detail, and the camera manages to maintain image information up to ISO 12,800, so we'd feel perfectly comfortable with using those images after a bit of sharpening in post. What we do notice though, is that the camera seems to bias exposure towards maintaining highlights, resulting in slightly darker exposures than the other cameras in this shootout.



You get a good amount of detail at the lower ISOs even in lowlight.



Impressively, you'll be able to reach up to ISO 25,600 for details to get lost.

T E S T - PROSUMER MIRRORLESS CAMERA SHOOTOUT



MODEL	CANON EOS M3	NIKON 1 J5	SAMSUNG NX500	SONY A6000
MOUNT	Canon EF-M	Nikon 1	Samsung NX	Sony E (NEX)
FOCAL LENGTH MULTIPLIER	1.6x	2.7x	1.5x	1.5x
SENSOR	CMOS	BSI-CMOS	BSI-CMOS	CMOS
SENSOR SIZE	APS-C (22.3 x 14.9mm)	1" (13.2 x 8.8mm)	APS-C (23.5 x 15.7 mm)	APS-C (23.5 x 15.6mm)
EFFECTIVE PIXELS	24.2-megapixels	20.8-megapixels	28.2-megapixels	24.3-megapixels
ISO SENSITIVITY	100-12,800 (expandable to 25,600)	160-12,800	100-12,800 (expandable to 51,200)	100-25,600 (expandable to 51,200 with multi-frame NR)
NUMBER OF FOCUS POINTS	49	171	209	179
MAXIMUM SHUTTER SPEED	1/4,000	1/16,000	1/6,000	1/4,000
MAX CONTINUOUS FRAME RATE	4.2 fps	60.0 fps	9.0 fps	11.0 fps
FLASH	Yes	Yes	Yes (screw-on flash provided)	Yes
MAX MOVIE RESOLUTION	1,920 x 1,080 (30p)	4K (15p)	3,840 x 2,160 (30p)	1,920 x 1,080 (60p)
WI-FI	Yes	Yes	Yes	Yes
VIEWFINDER	No	No	No	Electronic (built-in)
MONITOR	3" ClearView II TFT-LCD with tilt and touch, approx. 1.040 million dots	3" TFT LCD with tilt and touch, approx. 1.037 million dots	3" Super AMOLED TFT with tilt and touch, approx. 1.036 million dots	3" tilting TFT LCD, approx. 921 thousand dots
SIZE	110.9 x 68.0 x 44.4mm	98.3 x 59.7 x 31.5mm	119.5 x 63.6 x 42.5mm	120.0 x 66.9 x 45.1mm
WEIGHT (INC. BATTERIES)	366g	231g	287g	344g
PRICE	\$899.00 (with EF M18-55)	\$709.00 (with 1 NIKKOR VR 10-30MM f/3.5-5.6 PD-Zoom)	\$1,159 (with E PZ 16-50 Power zoom)	\$1,099 (with SELP1650 lens)

AND THE BEST PROSUMER ILC IS



SONY A6000

This came down to a choice between the Samsung NX500 and the Sony a6000, and could easily have gone either way. Both cameras offer professional-quality images in consumer-friendly packages, with good auto white balance and sharpness overall. They're also quick, responsive cameras in terms of autofocus speed, and response time in between shots. While 4K video capabilities and 1/6,000 max shutter speed on the NX500 is enticing, the a6000 offers faster burst and a built-in EVF, which frees up its hotshoe for other accessories. In the end, the deciding factor was actual image quality. The a6000 wins our shootout because it managed to maintain the best detail at higher ISOs, meaning you can capture quality images over a wider range of situations.

vs

ASUS STRIX GEFORCE
GTX 980 TI

•

GIGABYTE GEFORCE
GTX 980 TI G1 GAMING

•

MSI GEFORCE GTX 980 TI
GAMING 6G

•

PALIT GEFORCE GTX 980 TI
SUPER JETSTREAM





THE BEASTS UNLEASHED

The NVIDIA GeForce GTX 980 Ti is an enthusiast-level gaming card targeted at gamers who aren't particularly price conscious, as long as they get the bleeding-edge gaming performance they paid for. Find out which card comes ahead in this high-end graphics slugfest.

Text by *Koh Wanzhi*

Photography by *Jasper Yu + Vernon Wong*

Art Direction by *Ian Chong*

ASUS STRIX GEFORCE GTX 980 TI

The ASUS Strix GeForce GTX 980 Ti OC edition features the new DirectCU III cooler from ASUS. It is a fairly staid red, black, and gray design that manages to stand out without being particularly garish.

The DirectCU III cooler is a triple-fan affair, with each fan featuring something ASUS calls a wing-blade design that serves to increase airflow and static pressure to drive air through the heatsinks. And has become de rigueur on most custom coolers today, the fans are capable of powering down entirely while under less demanding workloads. Naturally, this means that you won't have to put up with any incessant whirring when you're trying to get some real work done.

The card comes with some impressive clock speeds right out of the box. It features the highest factory overclock out of all our tested cards, with a core clock of 1,216MHz and boost clock of 1,317MHz in OC mode. In Gaming mode, the clock speeds are slightly lower at 1,190MHz base clock and 1,291MHz boost clock.

A brushed metal backplate adds structural rigidity to the card. But instead of having a backplate that covers every inch of the PCB,

ASUS has left a cutout for the GPU itself. In the middle of this cutout is a striking red metal plate - ASUS calls this a GPU Fortifier - to provide dedicated support to the GPU. Furthermore, it shows off its Super Alloy II capacitors through smaller cutouts on the backplate.

ASUS has placed heavy emphasis on outfitting this card for overclocking, and it uses a 14-phase power delivery for greater stability. Indeed, the card managed to achieve the highest overclocks in our overclocking tests.

The card features a standard complement of display connectors, comprising one DVI-D port, three DisplayPort outputs, and one HDMI connector.

Power is delivered via two 8-pin PCIe connectors, up from the single 6-pin and 8-pin connectors on the reference

card. Two LED lights located above the PCIe connectors will also glow white when a successful connection has been established, which will help you rule out loose connections when troubleshooting.

When it comes to installation, you'd do well to check if you have sufficient clearance in your chassis as the card is just over 30cm long.

+
Stellar out-of-the-box performance.

-
Power hungry and runs hot.



AT A GLANCE

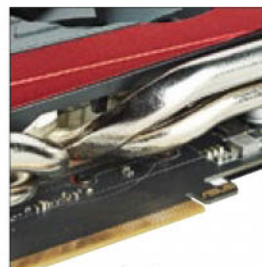
GPU Transistors
8 billion

Core Clock
1,216MHz

Memory
8GB GDDR5

Memory Clock (DDR)
7,200MHz

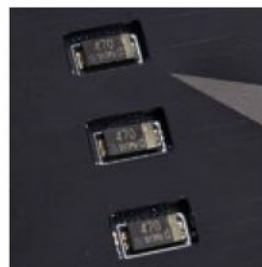
Price
\$1,179



The card sports two thick 10mm heatpipes to help with heat dissipation.



A dedicated GPU fortifier provides support to the GPU.



ASUS shows off its Super Alloy Power II components through the backplate.

GIGABYTE GEFORCE GTX 980 TI G1 GAMING

The Gigabyte GeForce GTX 980 Ti G1 Gaming sports Gigabyte's signature triple-fan WindForce cooler. However, instead of the stealth, all-black design we're used to, Gigabyte has opted for a copious dash of silver around the edges of the fan shroud.

Each individual WindForce fan also features five raised ridges and a triangular protrusion from the inner edge of the fan blade. This is a fairly distinctive design and it isn't just for show. Gigabyte says it helps improve cooling, presumably by increasing airflow and directing air more efficiently through the heatsink fins.

The fans are able to stop spinning during low loads. There are helpful "Silent" and "Stop" indicators on either side of the lighted WindForce logo that show you whether the fans are spinning or not. Both indicators light up when the fans are still, but go dark when they start up. The WindForce logo can also be customized with up to seven different colors through Gigabyte's OC Guru II utility.

The card ships out of the box in Gaming mode, with a base clock of 1,152MHz and boost clock of 1,241MHz. There is an OC mode available, which bumps the speeds up to a

1,190MHz base clock and 1,291MHz boost clock.

Under the hood, the card is producing using something Gigabyte calls GPU Gauntlet Sorting. Fancy marketing jargon aside, this means that the GPU chips have been cherry-picked for power efficiency. In fact, there just might be something to it as the card posted the second lowest peak power consumption numbers in our tests.

One standout feature of the card is the addition of one more DVI-D port at its rear. It supports Gigabyte's Flex display technology, and the additional DVI-D port will give users more flexibility when it comes to choosing which monitors and display outputs to use. Considering the GeForce GTX 980 Ti supports up to four displays, this is quite

a useful feature.

And like all the other cards in this shootout - with the exception of Palit - the Gigabyte GeForce GTX 980 Ti G1 Gaming draws power via two PCIe 8-pin connectors.

It is also slightly longer than its triple-fan ASUS counterpart, and the addition of a rigid brushed metal backplate provides much-needed structural support.



Efficient power consumption.



Might not fit in smaller cases due to length.

AT A GLANCE

GPU Transistors
8 billion

Core Clock
1,152MHz

Memory
8GB GDDR5

Memory Clock (DDR)
7,010MHz

Price
\$1,139



"Stop" and "Silent" indicators light up when the fans stop spinning.



There is an additional DVI-D port for greater flexibility in multi-display setups.



Each fan features raised ridges and a triangular protrusion for better airflow.



MSI GEFORCE GTX 980 TI GAMING 6G

The MSI GeForce GTX 980 Ti Gaming 6G boasts MSI's stellar Twin Frozr V cooler. Unlike the ASUS and Gigabyte cards, MSI's version of the GeForce GTX 980 Ti uses just two larger 100mm Torx fans.

Since we're not quite sold on the benefit of using more fans over fewer, larger ones, we actually prefer MSI's implementation. The card is shorter (at 26.9cm long), which means easier installation and less issues with case compatibility. And as our temperature tests will show later, less can be more.

The entire cooling apparatus is helped along by 8mm-thick heatpipes, which MSI says has been laid out for maximum cooling efficiency.

Like the other cards reviewed here, the MSI GeForce GTX 980 Ti Gaming 6G comes with different pre-set modes and clock speeds. It ships in OC mode, with a base clock of 1,178MHz and boost clock of 1,279MHz. There is also Gaming mode, which has a slightly lower base clock of 1,140MHz and boost clock of 1,228MHz. Then there's Silent mode, which takes the card down to reference clock

speeds consisting of a 1,000MHz base clock and 1,076MHz boost clock.

The cooler itself is decked out in the black-and-red color scheme that we've been used to seeing on many MSI cards. As expected, the Torx fans can also stop spinning during low workloads and are able to work independently of each other. This means that it's possible

for only one of them to be spinning at any one time, which allows the card a finer level of control over cooling and noise levels.

In addition, the MSI dragon insignia on the card's side can be configured with up to five different lighting modes in the MSI Gaming App to suit your system's aesthetic.

The backplate itself is an almost solid slab over the card's PCB, with a subtle dragon logo emblazoned across one side.

Display connectors are a similarly bog-standard affair with one DVI-I port, three DisplayPort connectors, and a single HDMI output. The card draws power from two 8-pin PCIe connectors for increased overclocking headroom over the reference card.



Excellent cooling performance.



Could have higher factory overlocks.



AT A GLANCE

GPU Transistors
8 billion

Core Clock
1,178MHz

Memory
8GB GDDR5

Memory Clock (DDR)
7,096MHz

Price
\$1,139



The MSI dragon insignia is etched onto the card's metal backplate.



The LED-illuminated dragon can be configured with a variety of lighting effects.



The dual 100mm Torx fans can operate independent of each other.

PALIT GEFORCE GTX 980 TI SUPER JETSTREAM

The Palit GeForce GTX 980 Ti Super JetStream is clocked the same as the Gigabyte GeForce GTX 980 Ti G1 Gaming, with a base clock of 1,152MHz and boost clock of 1,241MHz. The Palit is the only card with only one pre-set though, so if you'd like to overclock it for more performance or lower clock speeds for less noise, you'd have to rely on a manual overclocking utility.

Aesthetically, its dual-fan JetStream cooler is quite plain, with a smooth silver exterior and a dash of black at the edge. The JetStream insignia is inscribed on the shroud toward the card's rear, together with the Chinese character for wind.

With so much emphasis being placed on cooling and airflow in the naming and aesthetic of the card, the 100mm fans naturally also feature design tweaks to increase static pressure and airflow. According to Palit, the fans rotate in opposite directions to reduce conflicting air currents and improve airflow. They can also power down under less demanding workloads for completely silent operation.

But as you'll see in the temperature tests later, Palit's implementation of its cooling

solution is considerably less effective than that of its competitors.

Palit has also shunned LED-illuminated insignias in favor of a lighting solution that centers around the cooler's fans. The fan blades are slightly translucent, which allows the built-in white LEDs to shine through.

Finally, no high-end card would be complete without a backplate, and the Palit is no exception. The design is reminiscent of the ASUS card, where there was a large cutout for the GPU and a dedicated reinforcement brace.

When it comes to display connectors, there is the expected selection of ports in the form of one DVI-I port, three DisplayPort outputs, and one HDMI port. There is a distinctive honeycomb mesh at the rear that looks to facilitate heat exhaust.

Interestingly enough, Palit has decided to stick with the reference design of one 6-pin and one 8-pin PCIe connector for power, making it the only card in the shootout not opt for the increased overclocking headroom offered by dual 8-pin connectors. As it turns out, this does indeed have a negative impact on overclocking.

+
Good value for money.

—
Poor cooling performance despite low clock speeds.



AT A GLANCE

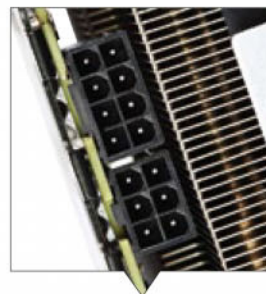
GPU Transistors
8 billion

Core Clock
1,152MHz

Memory
8GB GDDR5

Memory Clock (DDR)
7,012MHz

Price
\$999



The card uses one 6-pin and one 8-pin PCIe connector like the reference card.



The backplate sports a GPU cutout and dedicated reinforcement brace.

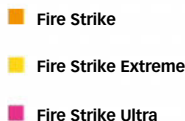


The translucent fans are illuminated by built-in white LEDs.

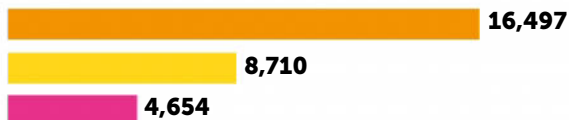
3D Mark 2013

(3D Marks, higher is better)

As expected, the ASUS Strix GeForce GTX 980 Ti inched ahead here thanks to its high factory overclock, which was the highest of the lot. The MSI GeForce GTX 980 Ti wasn't far behind however, and the ASUS card was on average just 3% faster.



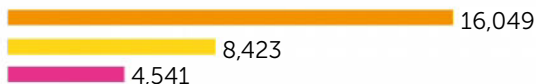
ASUS STRIX GEFORCE GTX 980 TI



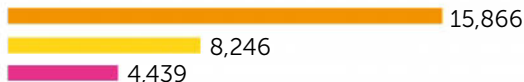
GIGABYTE GEFORCE GTX 980 TI G1 GAMING



MSI GEFORCE GTX 980 TI GAMING 6G



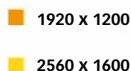
PALIT GEFORCE GTX 980 TI SUPER JETSTREAM



Crysis 3 Ultra Settings, 8x AA

(Higher is better)

The cards are all within a couple of frames of each other on Crysis 3, with ASUS and MSI leading the race. The ASUS card is actually less than a frame ahead of the MSI card, a minuscule difference that will hardly be noticed in-game. Hard figures aside, the small differences in real-world performance mean that we are better off relying on other performance metrics like temperature to assess the cards.



ASUS STRIX GEFORCE GTX 980 TI



GIGABYTE GEFORCE GTX 980 TI G1 GAMING



MSI GEFORCE GTX 980 TI GAMING 6G



PALIT GEFORCE GTX 980 TI SUPER JETSTREAM



Temperature

(Degrees Celsius, lower is better)

The MSI GeForce GTX 980 Ti Gaming 6G stands out thanks to its leading cooling performance. It posted a peak temperature of 64°C, beating the ASUS card by a good 10°C. Of course, the ASUS card is clocked higher and so would output more heat, but MSI's Twin Frozr V cooler even managed to inch out the Gigabyte GeForce GTX 980 Ti G1 Gaming. The Gigabyte card is clocked lower and sports three fans, which makes the MSI card's performance quite impressive.

ASUS STRIX GEFORCE GTX 980 TI



GIGABYTE GEFORCE GTX 980 TI G1 GAMING



MSI GEFORCE GTX 980 TI GAMING 6G



PALIT GEFORCE GTX 980 TI SUPER JETSTREAM





MODEL	ASUS STRIX GEFORCE GTX 980 TI	GIGABYTE GEFORCE GTX 980 TI G1 GAMING	MSI GEFORCE GTX 980 TI GAMING 6G	PALIT GEFORCE GTX 980 TI SUPER JETSTREAM
CORE CODE	GM200	GM200	GM200	GM200
GPU TRANSISTOR COUNT	8 billion	8 billion	8 billion	8 billion
CORE/BOOST CLOCK SPEEDS	OC mode: 1,216MHz/ 1,317MHz Gaming mode: 1,190MHz/1,291MHz	OC mode: 1,190MHz/1,291MHz Gaming mode: 1,152MHz/1,241MHz	OC mode: 1,178MHz/1,279MHz Gaming mode: 1,140MHz/1,228MHz Silent mode: 1,000MHz/1,076MHz	1,152MHz/1,241MHz
STREAM PROCESSING UNITS	2,816	2,816	2,816	2,816
TEXTURE MAPPING UNITS (TMU)	176	176	176	176
RASTER OPERATOR UNITS (ROP)	96	96	96	96
MEMORY	6GB GDDR5	6GB GDDR5	6GB GDDR5	6GB GDDR5
MEMORY CLOCK SPEED (GDDR5)	7,200MHz	7,010MHz	7,096MHz	7,012MHz
MEMORY BUS WIDTH	384-bit	384-bit	384-bit	384-bit
MEMORY BANDWIDTH	345.6 GB/s	336.6 GB/s	340.6 GB/s	336.6 GB/s
PCI EXPRESS INTERFACE	PCIe v3.0 x16	PCIe v3.0 x16	PCIe v3.0 x16	PCIe v3.0 x16
VIDEO PORTS	1 x dual-link DVI-I, 1 x HDMI 2.0, 3 x DisplayPort	1 x dual-link DVI-I, 1 x dual-link DVI-D, 1 x HDMI 2.0, 3 x DisplayPort	1 x dual-link DVI-I, 1 x HDMI 2.0, 3 x DisplayPort	1 x dual-link DVI-I, 1 x HDMI 2.0, 3 x DisplayPort
HDCP OUTPUT SUPPORT	Yes	Yes	Yes	Yes
PRICE	\$1,179	\$1,139	\$1,139	\$999

AND THE BEST GEFORCE GTX 980 TI GRAPHICS CARD IS



MSI GEFORCE GTX 980 TI GAMING 6G

The MSI GeForce GTX 980 Ti Gaming 6G takes home the prize for its excellent, all-round performance. While the ASUS Strix GeForce GTX 980 Ti might have come out on top in Crysis 3, it is ultimately still less than a frame ahead of the MSI card – a practically intangible difference. The MSI card also managed to edge out the rest of the cards in Crysis 3. What's tangible however, is the fact that the MSI's stellar Twin Frozr V cooler helped it achieve the lowest temperatures, an impressive feat considering its top-notch performance. MSI demonstrates that overly elaborate designs do not always equate to better cooling. Being over 3cm shorter than the triple-fan ASUS and Gigabyte cards also helps minimize case compatibility concerns and make installation easier.

FUSS-FREE HOME SECURITY

Netgear Arlo (VMS3230)

AT A GLANCE

Resolution
Up to 720p

Comes with
2 cameras,
1 base station

Field of view
130°

Features
Motion detection, night
vision, wire-free setup

Price
\$599



The Arlo cameras are small and wireless, but there's a separate base station you need to connect physically to your router.

CONCLUSION

The Arlo is one of the most versatile security cameras we've seen in a long while, but it doesn't come cheap.

The Arlo is a smart security camera that supports 720p video, night vision and motion detection, as well as options to view and share cloud recordings. Of course, there are plenty of IP cameras that do more or less the same things. However, the Arlo is one of the rare few we know of that can do all that while running on batteries (four CR123 lithium ones); not to mention touting a 130-degree field of view, a weatherproof design, and a '100% wire-free' setup.

Despite the wireless claim though, there's still this access point-sized base station that you need to connect to your router (using an Ethernet cable), and which requires its own power supply. However, the base station is probably needed for many of Arlo's nifty features, especially since it can communicate with multiple cameras. Naturally, this also allows the camera to be made very small, about the size of a mouse.

Placement is a cinch, thanks to the camera's

magnetic back. Coupled with its light weight (113g), it's able to stick securely onto the metal cabinets in our office without any adapter. The box also comes with magnetic mounts that use screws for mounting on surfaces should you need them.

The biggest problem with most IP cameras is their UI for setting up surveillance rules. The Arlo has done a good job here, employing an easy to understand if-then-and method. So a rule can read something like this: If motion is detected, (then) record a video, and send me an email alert. Different rules can also be combined to create a 'mode', so you can have different modes enabled at different times of the day. By default, when motion is detected, a 10-second clip is recorded and saved to the cloud. The free, basic plan that Netgear provides syncs up to five cameras, and keeps seven days' worth of recordings with a 1GB storage limit. You can set the camera to automatically delete the oldest files when it hits

the cap.

All in, we like the Arlo. The 720p MP4 footage (Best Video setting) that we got from the camera looked fairly sharp. There was a bit of lag during live streaming, but we've seen worse on other cameras. Our biggest gripe is that the Arlo doesn't have a speaker or microphone, so it can't do sound triggers or two-way audio communication. And while Netgear says the batteries can last four to six months, that's a based on four minutes of viewing or recording per day using the Optimized setting (640 x 352). And at \$599 for two cameras, its convenience definitely comes at a price.

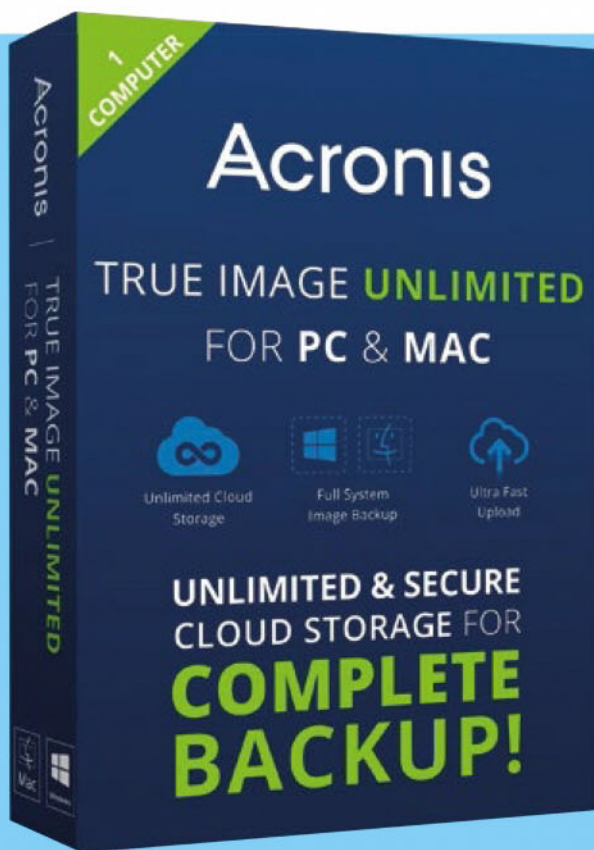
by Ng Chong Seng

TESTED & RATED

8.0_{/10}

HWM
SINGAPORE





AT A GLANCE

OS

PC & Mac

System requirements

For PC: 1GB RAM, 1GHz Pentium Processor or faster, 1.5GB of free space on a hard disk

For Mac: OS X 10.8 and above

Price

\$139.99/year



The UI features clearly labelled tabs that help with navigation.

UNLIMITED CLOUD BACKUP

Acronis True Image Unlimited

Acronis True Image 2015 Unlimited is one of the most complete data backup services we've seen. As the "Unlimited" moniker suggests, the software comes with powerful disk cloning, imaging, and recovery features, including unlimited storage on the Acronis Cloud.

With so many features onboard, it becomes paramount to have a clean and intuitive user interface, and Acronis has actually managed this quite well. The main menu is uncluttered and simply consists of five tabs on the left side bar, with options for Backup, Sync, Tools, Account and Help.

From the outset, it's pretty clear what all the tabs do so you waste

little time finding your way around. For instance, clicking Backup prompts you to choose the source disk you want to back up. Backups are stored on Acronis Cloud, and because you have unlimited storage, there's really nothing stopping you from making a complete backup of your entire drive.

In fact, this is one of the strongest selling points of the program. Free cloud storage services like Google Drive and Microsoft One Drive are aplenty, but they are better suited to backing up individual files instead of your entire drive. On the other hand, Acronis True Image 2015 Unlimited gives you an easy way to backup your drive with as few clicks as possible.

Acronis has 12 data centers across the globe, one of which is located right here in Singapore. By backing up your drive to Acronis Cloud, you can access your entire file library from anywhere in the world. We can definitely see this coming in handy for business users who travel frequently. Furthermore, once you make a full backup, subsequent backups will be completed more quickly because the software can backup incremental changes to the cloud.

And for those of you who are wary about relying on the cloud, there's also the option to protect your backups with a password that uses AES-256 encryption. Indeed,



The highly visual interface is a pleasure to use.

CONCLUSION

Acronis True Image Unlimited combines comprehensive data backup, recovery and migration features with an intuitive user interface.

security's probably another edge that Acronis has over free cloud storage services.

The software's core feature would have to be its disk cloning utility, which is accessed via the Tools tab. This lets you clone your drive to a target disk, a feature that will definitely come in handy when you're upgrading your OS drive. This is far simpler than doing a clean install on a fresh drive, and you can boot from the new drive as if nothing has changed.

All the features in the tool tab get a useful summary explaining their function, in case it's your first time with the software. Key features include the Rescue Media Builder that helps you recover your computer if it becomes unbootable, and Acronis Universal Restore, which allows you to restore your system if you've moved to a new machine with different hardware.

We particularly like its Parallels Access feature that lets you remotely access

and control your PC from your smartphone or tablet. You'll have to download the companion app from the Google Play Store or Apple's App Store of course, after which you can literally access your PC from wherever you are.

Acronis has managed to build a fairly robust ecosystem of utilities and programs that encourage you to use its services across multiple devices. For example, clicking the Sync tab enables you to automatically synchronize the data in Acronis Cloud across all your devices. This applies to mobile devices running either Android and iOS, and both Windows and Mac on desktop.

Our review copy only included a license for one computer, and you'll have to pay more for multiple licenses if you use more than one machine. However, the mobile app is free for anyone who already has an Acronis Cloud subscription. Subscription plans are

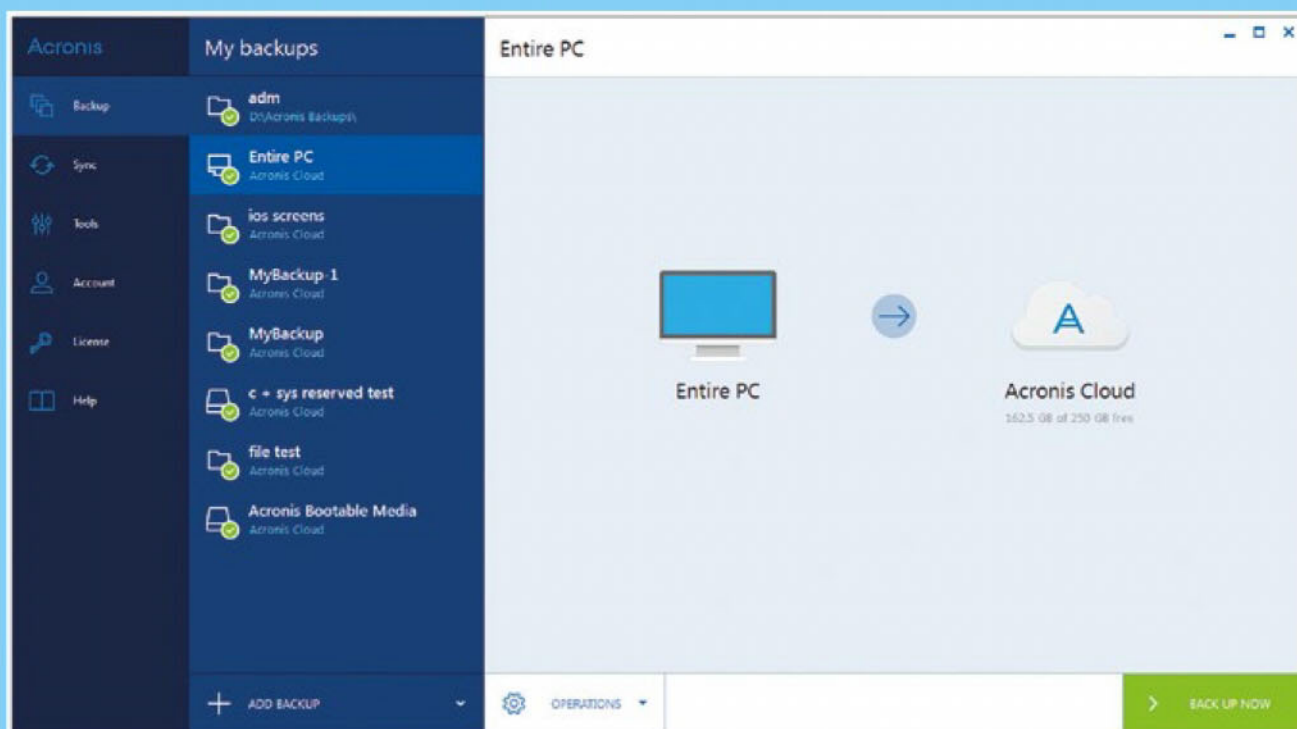
fixed at \$139 per year, which may initially seem steep, but don't forget that you get unlimited storage with a full suite of professional data recovery and cloning features. Comparatively, consumer cloud storage services like Dropbox, Microsoft OneDrive and Google Drive cost between US\$6.99 to US\$9.99 per month for 1TB of storage. Of course, those services offer basic free space too, but if you take data backup seriously, the True Image Unlimited solution is pretty hard to beat.

by Koh Wanzi

TESTED & RATED

8.5_{/10}

HWM
SINGAPORE





THE BEST SMARTWATCH FOR IPHONE USERS

Apple Watch

AT A GLANCE

OS
WatchOS 1.0.1

Size
38mm or 42mm
(vertical)

Storage
8GB

Requires
At least iPhone 5
and iOS 8.2

Price
\$798 - \$1,598
(Watch series)



The red outer ring tracks calories burned, the green middle ring tracks exercise, and the blue innermost ring tracks standing.

While the Pebble Time is Pebble's third smartwatch and the Gear S Samsung's sixth, the Apple Watch is Apple's first. To cater to different tastes, Apple has come up with three collections: Apple Watch Sport, Apple Watch, and Apple Watch Edition. In a nutshell, all three feature identical hardware under the hood. However, due to differences in materials used for the watch case, case size (38 or 42mm) and type of band, the price of an Apple Watch can balloon from \$518 to \$25,500.

There's really no point arguing if Apple is overcharging for the gold Edition series, since it is clearly positioned as a piece of jewelry to compete with luxury watches. For most of us, deliberating between the Watch and Watch Sport makes sense. If you're the clumsy sort who often brushes your arm against walls or railings, I recommend going for the former as the use of

sapphire crystal is much more scratch resistant than the Sport's glass cover.

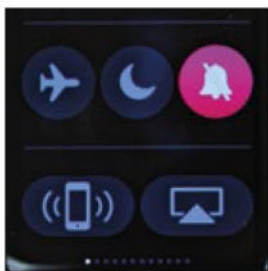
Unlike the Pebble however, the Apple Watch doesn't have an always-on display. Which means that even for the simplest of tasks like checking the time requires you to turn your wrist into a position that the Watch thinks you're looking at it. Speaking of watch faces, there are nine built-in ones on the Watch. Some show more details (complications) than the others, but overall, they're all tastefully done. For what it's worth, I like the Utility face, which is a practical face that offers quite a bit of customization.

Several early reviews have painted the Watch as being difficult to use, especially in the UI/controls aspect. I don't find it so. In broad strokes, there are only three cardinal rules to remember. One, turning the (digital) crown lets you scroll through lists or zoom into things. Two,

pressing the crown returns you (eventually) to the app home screen or watch face. Three, pressing the button below the crown brings you to a list of people you can connect with.

Then there's Force Touch, a feature that senses if you're pressing harder on the display. If you're trying to do something and have resorted to different button combos to no avail, try a hard-press on the display. For example, how do you select a different watch face when you're in the Clock app? Try force-touching it.

The Taptic Engine is another key feature of the Apple Watch. It is the component that gives you a tap (i.e., haptic feedback) on your wrist when a notification comes in or when you successfully activate a force touch. The vibration is unobtrusive, which is one way of saying that it's on the gentle side. Since I mute my iPhone and Watch all the time, there were a few occasions where



Glances, like this Settings Glance, are meant to serve up important info or controls quickly so that you don't need to go into the full app.

CONCLUSION

Forget the Pebble; if you use an iPhone, the Apple Watch is the only smartwatch that matters.

I missed a notification because I didn't feel the tap.

Apple is also touting the Watch as a revolutionary health and fitness device. Armed with a heart rate sensor and an accelerometer, it's able to measure your heart rate during workouts and the ways you move. But since it doesn't have built-in GPS, it relies on your iPhone to get accurate distance and speed information. Apple has put a lot of thought into devising ways to motivate Watch users, either through some gaming elements or pure nagging. For example, you collect achievements for completing certain fitness tasks, which may help motivate you to exercise more to unlock all the fitness badges.

And before I forget, the Apple Watch is rated at IPX7, which means it's able to withstand immersion in water up to 1m for up to 30 minutes. Rain droplets

or washing hands shouldn't negatively affect the Watch, but we do not recommend swimming, even if some users have reported successfully doing so.

The Apple Watch also comes with no less than 20 built-in apps, so it packs a lot of functionality right out of the box. While Apple's own apps generally work fine, some third-party apps can feel slow to load. And that's mainly due to them being extensions of the apps that are on the iPhone. The amount of data the phone has to pass over to the Watch, along with connection or network issues (especially when location data is involved) all contribute to the slowness.

That said, as near-native Watch apps are set to arrive in the fall thanks to WatchOS 2, and as developers get better with coding Watch apps, it's reasonable to assume that this speed issue would be

resolved in the near future.

So, do I recommend the Apple Watch? Yes, if you're an iPhone user. It integrates better with the OS than the Pebble, has more apps, and looks way nicer. Of course, I'm not going to deny the things that the Pebble does better than the Apple Watch, like its always-on screen and up to 7 days of battery life (the Apple Watch typically lasts me 1.5 days). But after the using the Apple Watch extensively for the past few months, I consider the trade-offs worth it.

by Ng Chong Seng

TESTED & RATED

8.5_{/10}

HWM
SINGAPORE



MINI MIGHTY ZAPPER

PowerDot

AT A GLANCE

Signal Channel

Dual independent stimulation channels

Waveform

Biphasic trapezoid

Voltage

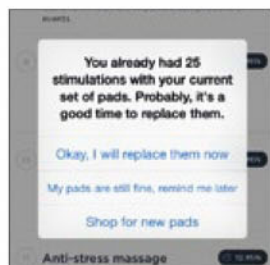
Peak 110V, <1V increments

Connectivity

Bluetooth 4.0 LE

Price

\$239



The PowerDot app will give you reminders to periodically change the electrode gel pads to maintain maximum effectiveness.

Electrical Muscle Stimulation (EMS) isn't something new. What EMS does is to send electrical impulses through conductive gel pads directly to targeted muscles to elicit muscle contraction. This is said to be more effective than the physical muscle contraction you would normally experience during a workout. The electrical impulses are also able to penetrate deep into fats and tissue to stimulate even hard-to-activate muscles. Through the use of different pulse patterns and durations, various effects can be achieved from pain relief to muscle conditioning and even improving the external attributes of your muscles.

EMS therapy is normally employed by physicians for muscle rehabilitation and also used in sports by athletes as a tool to aid muscle strength

training. In recent years, EMS has gained enough popularity that even gyms have started offering EMS-aided workout packages and personal, portable EMS devices are commonplace. However, these devices continue to be limited to the realm of general massage and stress relief; think Osim's uGoGo and uPixie products.

The PowerDot on the other hand is one of the first to try and bring professional EMS therapy into the consumer space. Unlike other personal EMS devices that are full control units, the PowerDot is merely the size of an oval pebble (6cm x 4.3cm). And that's basically the battery and Bluetooth components. All it has is one microUSB port which is used both as an input for charging and output for a pair of electrode pads. The PowerDot connects via Bluetooth 4.0 to your

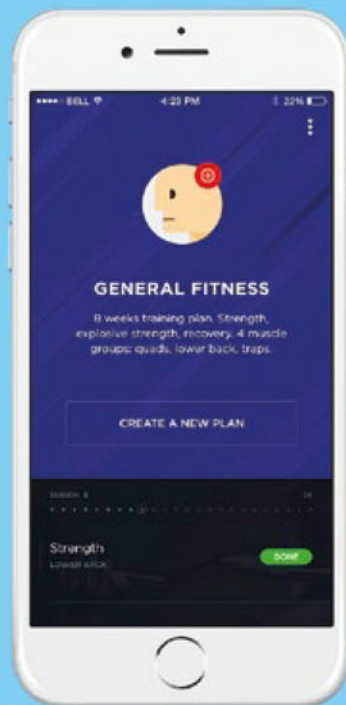
smartphone where all its functions are controlled via its companion app (supporting Android 4.3+ and iOS 7+ devices).

Setting up is simple. Just press the power button on the PowerDot till the LED starts blinking, which indicates Bluetooth pairing mode, then pair it with your phone. If you're unsure, upon first installation, the PowerDot app actually has step by step instructions for the whole process.

Once setup, connect the given electrode gel pads to the PowerDot and attach them to the specific muscle group on your body—the PowerDot device itself is also a stimulator—and start your preferred therapy session. Again, the app provides clear and precise instructions on what each program is suited for, do's and don'ts while stimulation is active, and



PICTURES POWERDOT



You can increase or decrease voltage on-the-fly through the app during an EMS session to stay within your comfort levels.

CONCLUSION

Powerful and professional EMS therapy in a portable device, the PowerDot is an excellent addition to any training routine.

visual cues on where you should attach the gel pads. This is especially useful for the average user who may not know by name where their 'deltoid' or 'adductor' muscles are.

The gel pads supposedly can last for a month assuming an average of 3-4 uses a week; I received a friendly reminder after 25 sessions to change (you get four sets of pads bundled, after which are separate purchases). This seems fairly accurate as the gel material began to degrade by then. With proper care—making sure your skin is clean and dry—you can probably get a few more zaps from the pads, but expect reduced effectiveness.

The PowerDot comes with 11 preset programs that cover everything from training muscle endurance, strength and resistance, to post-workout massage and stress relief. And it works. For such a small device, it packs a hell of a punch. If you've ever used other consumer EMS massagers like the

aforementioned Osim devices, the PowerDot is on a whole other level. Maximum voltage according to its specifications is 110V with <1V increments starting from 0.0V. The highest I can personally stand before muscle contractions become so strong that it hurts is around 35V. Testing the PowerDot on unsuspecting colleagues in the office, the lowest that someone has cried out to stop was around 13V. Now, I'm no athlete, but it does seem that the PowerDot has plenty of headroom for all fitness levels.

I won't actually go into the discussion of effectiveness because EMS itself is a proven technique as mentioned at the start of this review. The PowerDot is merely an extreme miniaturization that makes EMS therapy portable and accessible for everyone. For the average user however, I will have to caution that PowerDot is not an exercise replacement device. You can't just sit on the couch all day zapping yourself and expect to get six-pack abs.

Think of the PowerDot as a muscle conditioner. With frequent use, it will help improve your endurance and maintain muscle memory so when you do actually workout or perform your chosen sport, you can go longer, stronger and faster. The post-workout programs will then help your muscles relax and relieve tension from prolonged exertion. In a pinch, it is also a great general massager. It's not as effective in removing knotted muscles, but it works wonders at relieving those deep, dull muscle aches that human masseuses never seem to be able to reach.

by Zachary Chan

TESTED & RATED

9.0_{/10}

HWM
SINGAPORE

AT A GLANCE

Processor

Intel Atom Z3735F @
1.33GHz with 2MB
L2 cache

Graphics

Intel HD Graphics

Memory

2GB single-channel
DDR3L RAM

Price

\$229



The stick PC sports just one USB 2.0 port on its side.

JACK OF ALL TRADES

Intel Compute Stick

The Intel Compute Stick represents an effort by Intel to redefine the future of computing and make it even easier for us to fit computers into our everyday routines. A literal PC-on-a-stick, the device turns any HDMI-equipped display into a bona fide PC running Windows 8.1 (32-bit) with Bing.

Under the hood, this diminutive PC runs a quad-core Intel Atom Z3735F processor with a base frequency of 1.33GHz and burst frequency of 1.83GHz. Interestingly enough, this is a 64-bit processor, but we won't see any benefit of this because of the 32-bit version of Windows and 2GB of DDR3L RAM.

There aren't many options in the way of

connectivity or expansion options, and the Compute Stick has just one USB 2.0 port and a microSD card slot.

With an onboard 32GB of eMMC memory, Intel is probably counting on you storing most of your data in the cloud, or if you really must, on a microSD card. Indeed, as a portable PC, we could see the Compute Stick being used to gain quick access to your cloud drive.

Because of the 1x1 antenna array used by the Realtek RTL8723BS wireless/Bluetooth SoC module, the Compute Stick often isn't able to take advantage of the full speed and range of most wireless networks. As a result, normally speedy websites take quite long to load. Not to mention, it

lacks support for the latest 802.11ac standard, which means connecting to 5GHz networks are out of the question.

We tried some multi-tasking, but it was clear the Compute Stick was being pushed to its limits even by simulating an everyday productivity workload with multiple Chrome tabs, Microsoft Office and Spotify; our Stick froze abruptly on us. That's where the power button comes in handy, and we had no choice but to hit it to reset the mini PC.

However, if you don't try to force the Stick to handle too demanding a workload, it does perform decently. For instance, we were able to play a 1080p YouTube video (4K video is a different story) fairly smoothly and





There is a microSD expansion slot should you require more storage.

CONCLUSION

A glimpse of what computing can look like in the future, but isn't compelling enough to replace current dedicated devices.

even skip frequently to different parts of the video. It also proved itself quite capable of dealing with multiple Word documents and Excel sheets, arguably quite an important area of performance for a stick PC that prides itself on boosting productivity.

But we can't help but think that the Compute Stick's limitations put a huge dampener on the overall experience. How much do you really want to use a device that is supposedly a PC, but isn't quite capable of providing that PC experience? The Compute Stick functions well for short tasks and making the most out of existing HDMI displays, but we don't think you'll want to make this your main work machine or spend extended periods of time on it.

Then there is the issue of how portable it really is. The Compute Stick may be a pocket PC, but things aren't

so simple. The Compute Stick requires its own power source (delivered via microUSB), and you'll need to take its 5V power adapter around with it. The stick can run off a USB port on your display, but this method is unreliable at best. It doesn't always work, and you'll still need the extra power from the main adapter to power input peripherals.

And therein lies the crux of the matter – the Compute Stick is most useful in short bursts or when you simply don't have an ultrabook or PC on hand. It is not yet the full-fledged desktop replacement paradigm change Intel is touting. In its current iteration, the Compute Stick appears to hold more merit as a concept rather than an actual device. It can do many things, but none of them quite well enough to replace the myriad of existing devices we've come to rely on.

Still, its new form factor has already helped usher in stick PCs from other manufacturers, and hopefully, in the near future, pocket PCs that are truly viable.

If you want to do more with your living room TV but don't want to shell out for an HTPC, the Compute Stick might be a good bet. Otherwise, you're better off relying on ultrabooks or dedicated media streamers like the Google Chromecast for productivity and entertainment.

by Koh Wanzhi

TESTED & RATED

7.0_{/10}

HWM
SINGAPORE

AT A GLANCE

Processor

Intel Core i7-4790 @
3.6GHz with 8MB
L3 cache

Graphics

Zotac GeForce GTX 970

Memory

2 x 8GB DDR3 RAM

Price

\$2,176



The LED remote lets you customize your case's lighting on-the-fly.

CONCLUSION

A little rough around the edges, but an overall value-for-money PC with decent performance and upgrade options.

TESTED & RATED

8.0/10

HWM
SINGAPORE

BOUTIQUE DIY PC

Aftershock Tremor

Not all PC gamers want to build their own systems, which is why they often turn to pre-built models from the likes of ASUS and Dell Alienware. However, these systems usually come loaded with custom software and hardware with limited upgradeability options.

Enter the Aftershock Tremor, a pre-built PC with DIY roots that shows – quite successfully – you can indeed enjoy both convenience and upgradeability in a pre-assembled system. Instead of being chock full of custom parts, the Tremor houses retail hardware that you could purchase yourself. This means that it can be easily disassembled and upgraded.

Our review unit was powered by an Intel Core i7-4790 processor and Zotac GeForce GTX 970. There is also a generous 16GB of DDR3 RAM, a 128GB Ocz Arc 100 SSD, and a 2TB Toshiba

hard disk drive.

At the core of the system, Aftershock has used an ASRock H97M-ITX/AC mini-ITX motherboard that comes with a dedicated wireless 802.11ac and Bluetooth 4.0 module. The board also has just a single PCIe 3.0 x16 slot, so multi-GPU setups aren't an option if you go for this particular build.

The Tremor uses a Corsair Carbide Air 240 (supports up to micro-ATX boards) case, a small form factor windowed chassis that utilizes a dual-chamber design to separate your motherboard and graphics card from the hard drives and power supply. This facilitates much neater cable management as the power supply cables can be hidden in the spacious hard drive chamber. It also allows better airflow to more critical components like the CPU and graphics card.

Aftershock's machine also proves to be a fairly capable gaming system. It managed

a very playable 76.13fps in Middle-earth: Shadow of Mordor on Ultra settings at 1080p. We'd say that it's pretty capable of handling most modern games at such resolutions.

Furthermore, the Tremor has other tricks up its sleeve in the form of a remote-controlled LED lighting solution. The included remote lets you customize the color of the LED strip from up to 15 different colors. There are also options to set the lights to flash, fade or strobe. This does help spruce up the Tremor's exterior, which some might accuse of being slightly dull.

For its price, the Tremor provides a gentle introduction to the DIY market and a pathway for future upgrades. You'll also get a two-year parts warranty (one-year on-site) for the entire system.

by Koh Wanzi

LONG LASTING COMFORT

Jabra Boost

At first glance, the Jabra Boost appears unassuming thanks to its finger-sized, plain oblong shape and plastic chassis. The simple design language works in its favor, considering that the 49mm-short headset has sparse buttons, a clean layout and a humble price tag of \$78. It sets itself up as a fuss-free device.

And indeed, using the Boost is a straightforward affair. It has three buttons – two for volume control and one versatile Multifunction button for most purposes – and an on-off switch. The Multifunction button is for Bluetooth pairing and call acceptance, though the option to pause songs is strangely absent, considering that the Boost has A2DP support.

Its crowning feature is the beastly battery capacity, touting a talk time of up to nine hours and a standby lifespan of nine days! After a morning of calls and four straight hours of max-volume song blasting, the Boost still had 70% charge left for the day. If scaled down to moderate use, it's possible to go on for two days and more before the Boost needs a boost, which is a godsend if you're the kind that tends to forget to charge your devices now and then.

Soft EarGel tip lets the headset rest easy on the ears for the first three hours of continuous wear. Comfort is adequate, but it's not

going to outlast the battery life of the headset.

Call quality of the Boost is average though. It's adequately clear in a hushed office or even outdoors on the open street, but struggles a little in loud indoor environments such as a bustling café. I'd say it's not much different from using your phone – except, voice clarity is a little less accurate. This is most evident when using your phone's voice control features. What Siri would hear flawlessly over the speakerphone could end up with the occasional

mistranslation when spoken to through the Boost.

There's one caveat – the connection of the headset to the smartphone is spotty at the start. It takes a minute for the Bluetooth connection to stabilize and achieve smooth playback.

All in all, the Boost is surprisingly affordable, compact and boasts massive battery capacity. Overall audio quality and initial connection issues take some of that magic away, but its strengths balances out its shortcomings.

by Liu Hongzuo



AT A GLANCE

Headset Type
In-Ear

Operating Range
Up to 30 meters

Talk Time
9 Hours

Weight
8.5 g

Price
\$78



If the EarGel isn't secure enough, add the optional plastic ear hook for better ear grip.

CONCLUSION

Fuss-free headset, and a relatively reliable option with a battery life longer than the smartphone it's paired to.

TESTED & RATED

8.0_{/10}

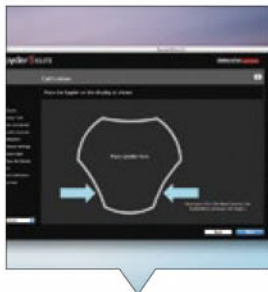
HWM
SINGAPORE

AT A GLANCE

Color sensor
7 filter/detector

Aperture size
27mm

Price
\$215 (Express)
\$310 (Pro)
\$435 (Elite)



Calibration is easy; just place the Spyder5 right here and let the software do the rest.

CONCLUSION

The Spyder5 is essential for professionals, and easy enough to use for anyone who wants accurate display color.

TESTED & RATED

9.0_{/10}

HWM
SINGAPORE

MAKE SURE YOU'RE SEEING WHAT'S REAL

Datacolor Spyder5

Image professionals have to ensure that the colors and brightness levels they see on their screens are as accurate as possible, and won't turn out garish and wrongly exposed when sent to print or broadcast.

That's why they and enthusiasts alike use tools like Datacolor's Spyder devices to calibrate their monitors for color accuracy. The Spyder5 is the latest in the family and is supposed to offer up to 55% improvement in tonal response, with seven new photo-detectors to read the colors on the monitor.

The Spyder5 looks radically different from its predecessor; gone are the three prongs that give it a 'spidery' look. Instead, the Spyder5 seems to have shrunk into a compact version of itself, more closely resembling a puck than an insect.

Once you have the software installed, the calibration process is quick and easy. All you have to do is place the Spyder directly on the screen where the software tells you to, using its cover as a cleverly designed counterweight. The software runs through a series of automated steps to create a profile, and the only time I had to do something was to manually adjust the brightness setting on my iMac.

After a few minutes, I was done. The Spyder app let me compare the results before and after calibration with a sample image, and it turned out that my iMac's color temperature ran a little cool. Then you save your color profile, and set a reminder for the next calibration, because monitor colors may 'drift' over time.

The Spyder5 comes in

three versions: Pro, Elite and Express. Hobbyists should do fine with the most affordable Express version, while enthusiasts can check out the Pro. Both the Pro and Elite versions can monitor the brightness of your room if you leave the Spyder5 plugged in. The Elite has the most comprehensive features; it lets you save individual profiles for multiple monitors and projectors, it can even calibrate for video.

For professionals and enthusiasts alike, the Spyder5 is a must, and the bonus is that it's easy to use. We spend thousands on our camera gear; it would be penny wise and pound foolish not to spend a little more to ensure our images look their best after the capture.

by Alvin Soon



FEATURE

WHICH APPLE NOTEBOOK IS FOR YOU?

13-inch notebooks seem to be the sweet spot for many with the best combination of performance, portability and display size. Coincidentally, Apple refreshed both its 13-inch MacBook Air and MacBook Pro with Retina Display this year, and also introduced an all-new ultra slim 12-inch MacBook. All three have their pros and cons, but which should you choose?

Text by *Kenny Yeo* Photography *Jasper Yu* Art Direction *Ian Chong*





THE MACBOOK AIR

If there was ever a notebook that could claim to be iconic, it would have to be the MacBook Air. Who can forget the instance Steve Jobs pulled the MacBook Air out of a manila envelope?

That was seven years ago, and although the design of the MacBook Air hasn't changed much and still remains relatively attractive, even the Air is looking a little chubby. At the present, the MacBook Air measures 17mm and its thickest point and this tapers down to an incredible 3mm. It also weighs 1.35kg, all of which means that one can hardly call the MacBook Air clunky. However, it can no longer claim to be the slimmest or the lightest notebook around.

Under the hood, the MacBook Air has received substantial upgrades in the form of Intel's newest fifth generation "Broadwell" processors. Broadwell is the codename for Intel's 14-nm shrink of its Haswell architecture and is claimed to bring about significant gains in performance and power.

Apple is offering two off-the-shelf variants of the MacBook Air and both will be powered by the same Intel Core i5-5250U processor (1.6GHz, 3MB L3 cache) with Intel HD Graphics 6000 integrated GPUs. Both models will also get 4GB of 1600MHz LPDDR3 RAM (upgradable to

8GB) and will differ only in their storage capacities - users can choose from 128GB or 256GB. Speaking of storage, the new MacBook Air gets upgraded PCIe-based SSDs that now use four PCIe lanes instead of two for even faster storage performance.

In terms of connectivity, the MacBook Air has a single Thunderbolt port that supports the newer Thunderbolt 2.0 standard, two USB 3.0 ports and an SDXC card reader. The MacBook Air has supported the wireless 802.11ac standard since 2013 and the latest model is no different. It offers data transfer rates of up to 867Mbps with a compatible 802.11ac router.

The most disappointing aspect of the MacBook Air is its display, because it is still the same TN panel that puts out a resolution of 1,440 x 900 pixels. This is a little sad by modern standards because there's no shortage of competing notebooks with higher quality IPS panels and also higher resolution displays. For example, Lenovo's Yoga 3 Pro and Dell's XPS 13 are both 13-inch notebooks with QHD+ displays that output a resolution of 3,200 x 1,800 pixels, which means more than four times the pixels. If it's any consolation, the display is still pretty crisp and the viewing angles and colors are still good and amongst the best in the business.



Despite its slimness, the MacBook Air has Thunderbolt 2.0 and USB 3.0 ports.



The MacBook Air's display is in need of a thorough refresh, 1,440 x 900 pixels don't cut it anymore these days.

THE MACBOOK PRO WITH RETINA DISPLAY

Like the MacBook Air, the MacBook Pro's design is getting a little stale and it's high time for a visual refresh. Fortunately, build quality remains impeccable, and at just 18mm thick and weighing less than 1.6kg, the MacBook Pro is actually quite decently sized considering the hardware it packs.

The MacBook Pro's Retina display has a resolution of 2,560 x 1,600 pixels, giving it a pixel density count of 227 pixels per inch. While it is outclassed by notebooks with QHD+ displays, Apple can still boast of better display optimization than its current Windows counterparts. And with pixel counts at such high numbers, most people will be hard pressed to tell the difference, unless you press up right next to the screen.

Like the MacBook Air, the MacBook Pro is powered by Intel "Broadwell" processors. Apple is offering three off-the-shelf variants of the MacBook Pro and they differ by processors and capacity. Users can choose from either the Intel Core i5-5257U processor (2.7GHz, 3MB L3 cache) or the slightly more powerful Core i5-5287U processor (2.9GHz, 3MB L3 cache). Both processors' graphics duties are handled by Intel's new Iris Graphics 6100 integrated GPU. All models will also get 8GB of 1,866MHz LPDDR3 RAM as standard, and users can choose from 128GB, 256GB or 512GB of storage. Like the MacBook Air, the MacBook Pro's PCIe-based SSDs will use four PCIe lanes instead of two, enabling better

storage performance.

Other improvements pertain to battery life. Battery capacity has been increased slightly from 74.9Wh from 71.8Wh - staggering for a notebook of its size - and this coupled with the more efficient Broadwell processor means that claimed battery life is up one hour to an impressive 10 hours.

Connectivity remains unchanged so the latest 13-inch MacBook Pro still gets two USB 3.0 ports and two Thunderbolt 2 ports as well as a single HDMI port and an SDXC card reader. 802.11ac of up to three spatial streams is supported so a maximum speed of 1300Mbps is possible if you have the right router.

One of the biggest updates to the MacBook Pro is the new Force Touch trackpad. Unlike traditional trackpads, the Force Touch trackpad does not have physical buttons and actually features sensors which detect your inputs and triggers electromagnets underneath the trackpad to vibrate the sheet of glass that is the trackpad. This vibration generates a haptic feedback that leads you into thinking that it is a click.

This new trackpad also opens up a new way of interaction called Force Click, which can be triggered by a firm click and can be used to do contextual tasks. For example, force clicking on a word can quickly show the definition of it, or when browsing, one could force click on a link to preview them.



It looks like Apple's ordinary glass trackpad, but touch it when the system is not powered and you'll find that it doesn't actually move.



The MacBook Pro has no shortage of ports, offering two Thunderbolt 2.0 and USB 3.0 ports each.





THE MACBOOK

The all-new MacBook is a completely different animal to the one that was phased out four years ago. That MacBook came in a white polycarbonate body was designed to be Apple's entry-level model. The new MacBook, on the other hand, is available in space grey, silver and gold, and is Apple's most portable notebook ever.

The new MacBook has a 12-inch Retina display that puts out 2,304 x 1,440 pixels and features a tapered design like the MacBook Air. It measures 13.2mm at its thickest point and 3.2mm at its thinnest. It also weighs a mere 920g.

One of the reasons why the MacBook is so thin is because it is driven by one of Intel's new Core M processors. These ultra low power processors require no active cooling, allowing manufacturers to design ultra thin fan-less chassis that are sleeker than anything before.

For the MacBook, Apple is offering two off-the-shelf configurations, with the differences being the processor and storage capacity. Both models will be equipped with 8GB of 1,600MHz LPDDR3 RAM. The entry-level model is powered by the Intel Core M-5Y31 processor (1.1GHz, 3MB L3 cache) and has 256GB of storage, whereas the more powerful model gets Intel's Core M-5Y51 processor (1.2GHz, 4MB L3 cache) and 512GB of storage.

Despite the low power processor, performance was adequate for the most part, and much of this can be attributed to

the speedy SSDs in the MacBook. Like the refreshed 13-inch MacBook Pro and MacBook Air, the SSDs in the MacBook utilize four PCIe lanes instead of the more common two for improved storage performance. On top of that, the drives in the MacBook also support the newer NVMe interface.

To achieve the MacBook's slim dimensions, Apple has had to re-engineer many important components. The keyboard, for example, uses a special butterfly switch that is considerably thinner than traditional switches. In fact, the new switch is so thin that the keycaps sit almost flushed against the chassis.

Along with the keyboard, the MacBook also gets Apple's new Force Touch trackpad. This new trackpad does away with physical buttons and instead uses sensors and magnets to trigger a haptic feedback when you click. On top of that, the Force Touch trackpad also introduces a new way of interacting with your Mac called Force Click, which we talked about earlier in our preview of the 13-inch MacBook Pro with Retina Display on the previous page.

And because the MacBook is so thin, there's no room for even standard USB ports, so Apple uses single USB Type-C port for data, video and even power. Due to lack of compatible devices for this new port type at the moment, you'll have to rely on hubs and adapters for existing devices. The alternative is to go completely wireless. Fortunately, the MacBook supports 802.11ac Wi-Fi with speeds up to 867Mbps.



The MacBook is so slim that the slimmer USB Type-C port can fit.



The keys are almost flushed against the chassis.

WHICH NOTEBOOK TO GET?

Apple has built for itself a very strong reputation for building desirable, high quality notebooks and its notebooks consistently rank amongst the highest in terms of customer satisfaction. Sales has also been growing steadily each year. Its current lineup of portable notebooks in the 13-inch space is arguably its strongest yet and each model has its own strengths and weaknesses, which also means to say that there is something out there for everybody.

The MacBook Pro is arguably the strongest all-rounder, and has been refined over the years to become what it is today. The Retina display is gorgeous and the new Force Touch trackpad opens up new ways of interacting with your favorite apps. And with its speedier processor and memory, it comfortably leads the other two notebooks in terms of performance. And at just 1mm thicker and 230g heavier than the MacBook Air, one could argue that it is just about as portable. What's also incredible is that despite its high performance, Apple still manages to pack in 10 hours of battery life. All in all, it's impressive that Apple can cram so much performance and features in a package that is still considered relatively

compact and portable. And though it might command a sizable premium over the MacBook Air, we feel that this is entirely justified considering all that it offers. For discerning users who demand the absolute best, the MacBook Pro is tough to beat.

The MacBook Air has come a long way. In the days of its inception, it was a premium ultra slim notebook, but it has since become Apple's most mainstream notebook. Unfortunately, it is in need of a more thorough refresh as its specifications are no longer cutting edge. Even though it packs lots of features and its performance is still respectable, it is very hard to get over its low-resolution TN panel display, which is starting to look absolutely ancient in the face of what competitors are offering. Nevertheless, the MacBook Air offers a good blend of performance and portability, and it is after all Apple's most affordable notebook. If you are not a fussy user, the MacBook Air is still a very good choice.

Finally, we come to the MacBook, perhaps Apple's most controversial notebook. To kick things off, there is no denying that it is extremely portable,

and credit must be given to Apple for successfully engineering such a thin and light notebook. However, Apple has had to sacrifice some important features to achieve this. For example, the keyboard will need some getting used to, as it has almost no travel. But most of all, users must be aware of the restrictions and limitations that come with having only a single USB Type-C port. The problem is twofold: the single USB-C port in the MacBook has to handle not only power, but potentially also video and other peripherals, and then there's the acute shortage of compatible USB-C peripherals in the market. As a result, even simple tasks such as copying contents from one USB drive to another will become more tedious. Unless your peripherals are wireless, adapters and USB hubs are certainly a must. Early adopters will definitely need to adapt their mindset and expectations of what the new MacBook. As a result, the MacBook is best suited as a secondary device since its long battery life and ultra compact dimensions and lightweight mean that it is most adept at life on the road. **HWM**



MACBOOK AIR: No longer cutting edge in terms of performance or portability but can still be an attractive all-rounder for mainstream users on a budget.

MACBOOK PRO: For those who don't mind sacrificing a little portability for the utmost in performance.

MACBOOK: For those who value portability above all, but require the functionality of a proper notebook and desktop OS instead of a tablet device like an iPad.

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MY EAR TO THE GROUND
SO THAT I CAN KEEP
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FEATURE

THE STATE OF E3

Another edition of the annual Electronic Entertainment Expo has come and gone, but the scene is no longer what it once was. GameAxis editor, Aaron Yip reminisces on many E3s past and provides insight into what the show means for the industry today.

Text and pictures by *Aaron Yip*

RESERVED

SMALLER, FOCUSED

My first E3 was 2001. The biggest news of the show was the reveal of Super Smash Bros. Melee for the yet-to-be-released GameCube. Much of the show floor buzz was about Take-Two Interactive's "riot simulator" State of Emergency, which had crowds of people waiting to play even as the Grand Theft Auto III booth on the opposite side of that display went frequently ignored.

This year's show is my 11th in attendance. The industry has changed. I've changed. And naturally, E3 has changed. It's smaller, for one thing. Kentia Hall is no longer a glorified flea market filled with dozens of different DVD case suppliers, lifelike gun peripheral importers, and the occasional industry-altering innovator. Instead, it is a parking garage.

These days, there is no need for Kentia Hall because there simply aren't that many exhibitors at E3. Sony, Nintendo, and Microsoft still have massive booths, but the rest of the field has been thinned. Gone are the Kemcos, the Midways, the THQs, and this year, even the Segas and Bandai Namco. The South Hall and West Hall aren't quite as full as they were in years past. Even the advertising has become less pervasive. The Staples Center sports banners for women's pro basketball, but nothing for Tony Hawk's Pro Skater. The three towers of the Hotel Figueroa now bear an ad for a movie instead of the next big AAA blockbuster.

Not all the changes are bad, of course. In my first couple of years at the show, it is common for exhibitors to employ booth girls in 'barely there' scantily-clad outfits and play ear-piercing rock and roll music in a bid to drown out nearby exhibitors. It was a juvenile play for attention, and one that was easily ignored in a sea of similarly tacky and tasteless marketing strategies. These days, women at the show are more likely to

"These days, there is no need for Kentia Hall because there simply aren't that many exhibitors at E3."



be hosting press conferences than pole-dancing at them.

E3 is still the most exciting week of the gaming year, but it will never be what it was again. It was a console gaming festival back when console gaming made up the majority of the industry. But gaming has long since outgrown the consoles, and so too has it outgrown E3. The show is still relevant to the industry, still crucial for many of the largest players, but it is no longer comprehensive.

I have long since stopped attending E3 hoping to see the Next Big Thing. These days I hope only to see a couple good console games I'll want to buy, and perhaps a few signs that the industry is getting better in some ways, that there are still things to look forward to. In that sense, this year's show was a resounding success, even to someone who's been through this whole routine many times before. **HMM**

Special E3 Moments

E3 is all about getting a glimpse of what's to come, and in the gaming industry, first impressions count. Here are three of our favorite moments from E3 2015.

The Last Guardian

There was something kind of magical about being in a room full of people when The Last Guardian was shown during Sony's press conference. Everyone went quiet as Scott Rhoads began his announcement, and we thought that maybe it wasn't this, it couldn't be this, it had been too long...but lo and behold, there it was. And everyone went silent with an air of reverence. The best moment of E3 was seeing this white whale, this mystical unicorn of game development suddenly there, in front of us, with a 2016 release date. The surreal is now real.

Halo 5: Guardians

Halo 4 wasn't everything many of us had hoped it would be, and the obvious issues with the Halo: The Master Chief Collection put a damper on this legendary franchise. However, Halo 5 appears to be on track to move the franchise forward in an exciting, meaningful way. Halo 5's 12v12 Warzone mode is a total blast. We played a few rounds at E3 and can't wait to jump back in come October.

Final Fantasy VII Remake

Sometimes, it's not always about what's new. When the trailer for Final Fantasy VII Remake hit the screen during the Sony press conference, every attendee lost it. Possibly one of the best video games in the Final Fantasy franchise...nay, one of the best games of all time, a remake has been long on the wish list for gamers. Even though the Remake will probably deviate from the source material in countless ways, we are thrilled to see Square Enix step out of their comfort zone.



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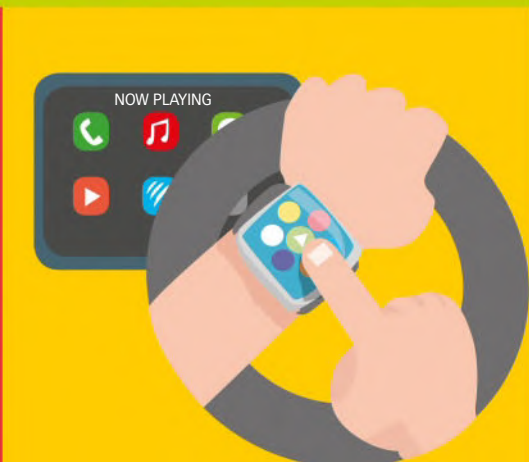
SUPERCARGE YOUR LIFE

Power up your life, streamline your routines, get out of sticky situations and get new life out of old devices with these top tips from the HWM team.

Text by *Kenny Yeo, Koh Wanzi and Salehuddin Husin*

Illustrations by www.skullbase.blogspot.com

Art Direction by *Ken Koh*



50 TECH TIPS, TRICKS AND HACKS

In celebration of Singapore's 50th year of independence, here's a compilation of 50 useful tips, tricks and hacks that you can use to improve your life and get more out of the everyday systems and gadgets you use.

01

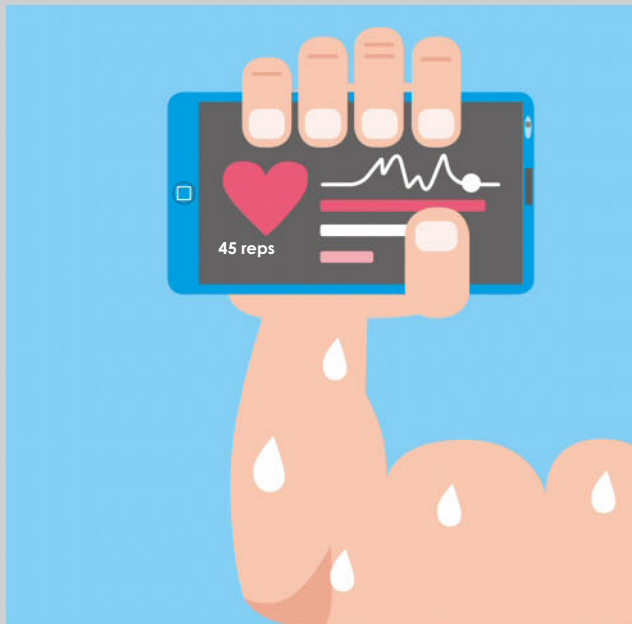
USE YOUR SMARTPHONE TO GET FIT

Forget signing up for expensive gym memberships; chances are you already have a smartphone and a mobile internet connection. Why not leverage the power of apps on your smartphone to help get on the road to a fitter you?

To start, we suggest MyFitnessPal, available for Android, iOS, Windows Phone, and yes, even BlackBerry. This app helps you track the calories you consume, complete with a database of food items that include Singaporean must-haves like chicken rice, laksa and more. You can set daily calorie consumption goals, with a target weight in mind.

Apps like Runkeeper help you take your workouts to the next level. Whether running, biking or a number of other fitness activities, you can track and chart your progress from your smartphone. A social component lets you share your workouts, or even cheer on your workout buddies also using the app.

Even better, a great number of apps can be linked to each other to share data. For example, MyFitnessPal works with Runkeeper, with both exercise and nutrition data put to better use to help you get a clearer picture of your goals and momentum.



02

MASTER GOOGLE SEARCH (SEARCH TIPS)

We know that Google is one of the best search engines in the world. However, what most won't know is that there are ways to streamline your search to get exactly what you want, by using search operators.

There are really simple ones, like using quotes marks to get the exact phrase, like:

"dark chocolate bars"

And using the dash before a word to strictly exclude it from your query, like:

"dark chocolate bars" -milk

All these operators help tremendously when you already know what you want, here are a few for you to try, just remember not to add any spaces between the operator and your query (use "site:hardwarezone.com.sg" for example, not "site: hardwarezone.com.sg"). You can even combine a few of these operators to get an even more accurate result.



03

TAKE BETTER PHOTOS BY USING YOUR EARPHONE CONTROLS

Blurry photos are often the result of shaky hands, especially in low-light situations. Even if you use the volume up button on your iPhone as a shutter button, the act of pressing down on the corner of the phone can ruin a photo.

Pro photographers often use a shutter release cable to avoid disturbing the camera, and you can actually do the same with your iPhone. You don't even need an app: all you have to do is connect a pair of earphones with volume controls (like Apple's own earbuds and earpods) to your iPhone. When you're in the camera app, just press the volume up button on your earphones and the picture is taken. (This method is also perfect for taking selfies.)



04

FREE DOWNLOADABLE CITY GUIDES FROM TRIPADVISOR

The next time you travel, you can then fill your smartphone or tablet up with travel guides that have been curated by TripAdvisor; filled with reviews, opinions, videos and photos by its users. City guides are standalone apps which work offline, which means you won't have to waste any money on hefty roaming charges.

Each guide has enough content regarding that particular city, and will have all of the restaurants, hotels and sights that can be found on the TripAdvisor website. You can follow a self-guided tour, created by users and experts, or you can create your own by using the GPS feature on your device. There's also a functional map that you can use to avoid getting lost, or to find the most efficient way of getting to a place of interest.

05

INTEL READYBOOST

ReadyBoost is a feature, first introduced in Windows Vista, to speed up the OS with a removable storage device. Usually, a thumb drive or a similar flash storage device is used. It provides additional storage that the system can access quicker than mechanical hard disk drives, which are attached over SATA interfaces.

However, ReadyBoost only supports a single, attached device at once. Minimally, the Windows system needs to support USB 2.0 and above technology. For this Windows feature to work effectively, the flash storage device needs to have a minimum capacity of 1GB, and ideally its capacity should be twice the amount of system memory. So if your system has 8GB of RAM, you need a flash drive with a capacity of 16GB.

06

ROOT YOUR ANDROID DEVICE

Before we go any further, rooting any phone automatically voids the device's warranty so, only do this on a phone that's more than a year old. Rooting your Android device is relatively safe and easy, but users need to take note that if they don't know what they're doing, there's a chance that their phone might be "bricked." Having a "bricked" phone simply means that your phone will be as useful as a brick.

Having said that, rooting your phone opens doors to apps that seek to control the phone's lowest level processes. These are the processes that control hardware components like the device's CPU, GPU, built-in LEDs and more. Exerting full control over your phone has many advantages, like better battery life when you combine control over the CPU and wireless radios for example, or increase storage capacity when you get rid of system apps (like those put in by service providers) that you don't need.

Besides having control over the hardware, having a rooted phone also means that you've given yourself permission to change everything about the phone, including how it starts up and what kind of kernel (the interface between hardware and operating system) you have. Experienced users can even change the operating system entirely; a necessity if your phone no longer receives OS updates from its manufacturer and you want the latest software.

Most of these software updates solutions for unsupported (but rooted) devices are written by amateur developers who are as skillful as in-house developers, and they're absolutely free. It would help however, if they received donations for their work, which in turn goes to fund new devices which these developers can work on and support.



07

USE A PASSWORD MANAGER

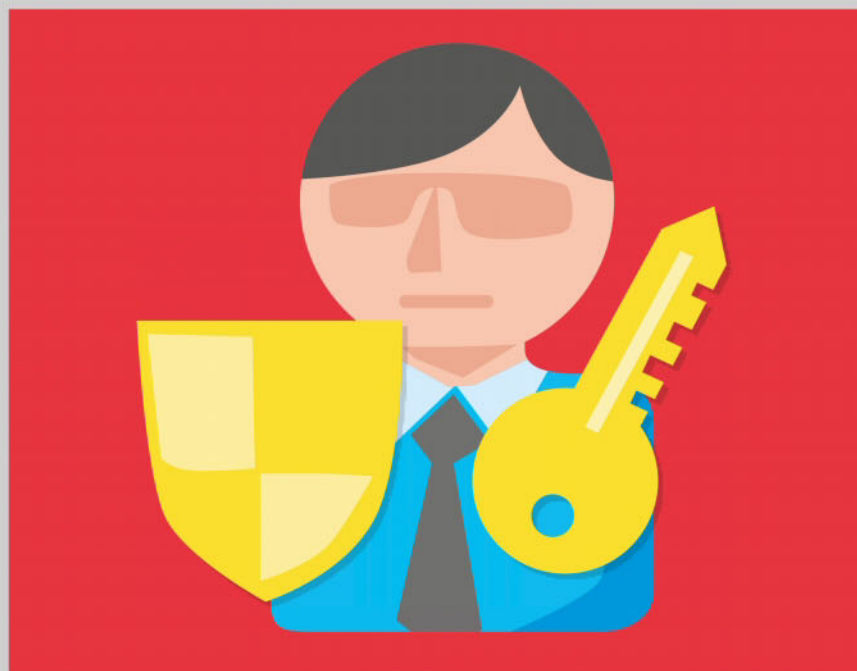
Adobe has been hacked, Twitter has been hacked, and LinkedIn has hacked - just to name a few of the popular services where user accounts and passwords have been compromised in recent years.

What this means is that if your account details were stolen, in a worst case scenario your password and email account may have been revealed to an unscrupulous third-party. And if you reuse your passwords, that person just got access into your email account plus other services - maybe even one with your credit card account stored on file.

The standard advice is to use better passwords; like a long, nonsensical phrase that's easy to remember but hard to guess, with a combination of numbers and symbols, say: "John Combusts 76 Amazon!". But we'd go one step further and say that except for a few key services, you shouldn't even know your own passwords. Instead, if you're serious about security, and you should be, use a password manager.

A password manager can create long passwords which are humanly impossible to remember but more difficult to crack, like "aIn#K35so)+aNI24@". But you don't even have to remember it, a password manager can fill in passwords for you and help you to log into your websites. To keep passwords safe, all you need is to create and remember one strong master password for your manager.

Read our password manager shootout article to find out which is best.



08

RESTORING YOUR PC TO AN EARLIER TIME

Say you installed a new driver, and suddenly you're running into all sorts of other problems with your PC. This is where System Restore will come in handy. In Windows 8.1, move your cursor into the top-right corner of the screen to bring up the Settings menu. Click on the Control Panel, type "Recovery" into the search box, and hit "Open System Restore" to begin the restore process. Your system automatically creates restore points, so unless yours is a brand new PC, you should have a few options to choose from. Select one from a point before when the problem first showed up and let the program walk you through the rest.

09

BOOST USB TRANSFER SPEEDS

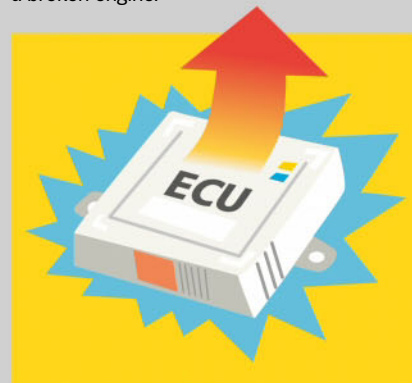
If you're a stickler about USB performance and own an Intel PC, this one's for you. Enter BIOS as your PC is booting up (you usually have to hit F2 or Delete, but this may vary according to your motherboard) and navigate to the Advanced menu. Enter the CPU Configuration sub-menu, followed by CPU Power Management Configuration, and look for the options for Enhanced Intel SpeedStep Technology and CPU C-States. Disable both of them and then save and exit the BIOS to reboot to your desktop. Once you're there, head to your Control Panel to visit the Power Options setting. Simply set your preferred power plan to High Performance, and enjoy faster file transfers from your external hard drive!

10

UPGRADE YOUR CAR USING FIRMWARE UPDATES

The modern day car can be in some ways thought of as a computer processor. Generally speaking, processors are underclocked to ensure stability and reliability, and the same goes for cars. It also means that with some tweaking, cars can be 'overclocked' too.

Typically, this can be achieved by overriding the car's stock ECU with a standalone unit, and then adjusting values such as advancing or retarding the ignition timing to achieve more efficient combustion or adding more fuel to the mix. If done properly, not only will you gain more power, but the engine will be more efficient as a result. It goes without saying that such a job is best left to a professional who has intimate knowledge of such tuning procedures, lest you end up with a broken engine.



11

MONITOR DATA USAGE ON YOUR SMARTPHONE

With the three telcos implementing data caps on their smartphone plans, it's become necessary to keep a closer watch on the amount of data used by your phone. The three telcos have rolled out their respective apps (MyM1, My SingTel and My StarHub) where subscribers can check the estimated data usage for a particular month.

You also can check out Onavo Extend, a third-party app that goes a step beyond data monitoring. It also minimizes your data usage by using compression technology on its cloud servers. According to its developers, Onavo Extend compresses data up to 80%. Hence, this app is useful for users who travel overseas often and want to reduce roaming charges.



12

ANDROID APPS ON LOCKDOWN

If you're using a smartphone, chances are your entire life is stored on the device. You're probably permanently signed in to your Google account as well as Facebook. Power users may have other accounts for Dropbox, Twitter, LinkedIn and other services synced up as well. While this setup is convenient, it also means anyone who can get past your smartphone's lockscreen can access your data.

However, there is a convenient way to safeguard your data and limit access on your Android smartphone. The free AppLock app can password protect access to SMS, Contacts, Gmail, Facebook, Gallery, Google Play, Settings, Calls and any other app of your choosing. With AppLock enabled you can pass over your smartphone to friends and family with complete peace of mind, knowing that they won't ever be able to tweet-jack you.



13

DECLUTTER YOUR GMAIL (DELETE LARGE ATTACHMENTS)

If you've been using Gmail for a while, chances are that you've used up a lot of your storage. Google now gives you 15GB of free storage, but it's now shared between Google Drive, Gmail and Google+ photos.

If you need to clean out and declutter your massive Gmail archive, you can now search your emails by size. In Gmail's search box, use "larger:5m" (without quote marks) to find emails larger than 5MB, and combine it with the search term "older_than:1y" (without quote marks) to find emails older than a year older.

You can also combine the two search terms to find emails larger than 5MB that are older than 1 year by typing in "larger:5m older_than:1y", and change the variables, to find emails larger than 10MB and older than 2 years for example; "larger:10m older_than:2y".

If you're not sure whether or not it's Gmail that's taking up your storage space, head over to your Google Drive Storage page (<https://www.google.com/settings/storage>) to see how you're using your 15GB.

14

ACTIVATE TWO-FACTOR AUTHENTICATION

Two-factor authentication (or 2FA) helps to secure your accounts by adding an additional stage of verification while trying to log in. For example, if you enable 2FA on Google, you'll be asked to log in as usual with your username and password. A code will then be sent via SMS to your mobile phone, which you'll have to enter in to complete the login.

You'll usually only be asked to input a 2FA code when you try to log in using a new computer. Although it can be more tedious (especially if you're traveling overseas or have a shaky signal), 2FA helps prevent unauthorized users from logging in as you, if they somehow manage to get your username and password but don't have your phone.

Not every site offers 2FA, and even those which do might limit 2FA to certain countries. Right now, services which offer 2FA include Google, Facebook, Dropbox, LinkedIn, Twitter, Wordpress and Yahoo. If you're a user of any of these services, sign up for 2FA today and keep your data secure.



15

GOOGLE APPS FOR SMALL BUSINESSES

Starting a small business usually means that there are plenty of things you need to pay for. To save yourself a tidy sum, sign up for Google Apps for Business. Google Apps for Business includes frequently used services like email (Gmail), and cloud storage (Google Drive), which could cost business owners more using conventional business software.

There's also the recently improved Google suite of browser-based office software (used to be called Google Docs) that seek to replace expensive office software like Microsoft Word, Excel and Powerpoint. The office software from Google is saved in the cloud using Google Drive and allows multiple users to work on a document at any given time, making collaboration a breeze. Prices for such a service start at US\$5 a month (\$50 a year) for one user.

16

HELP YOUR PC BOOT UP FASTER

If you're still stuck with a mechanical hard drive from the last century as your boot drive, here are a couple of tricks to make your machine boot faster. First off, you'll want to call up the System Configuration window. In Windows 7, this is done by entering "msconfig" into the Start Menu's search bar. Things are a bit different in Windows 8, where you need to hit Win+R and enter "msconfig" into the search box. In System Configuration, click the "Startup" tab to view the list of programs that are set to run at startup. Uncheck all non-essential programs like Steam and Skype, hit apply, and exit. Finally, ensure that your desktop is absolutely clean. A few shortcuts are fine, but you shouldn't have large folders sitting around there.

17

UPGRADE TO AN SSD

Solid state drives (SSDs) have come a long way in terms of both performance and price. Not only were early SSDs expensive, they were also not that much quicker than traditional mechanical hard disk drives. Now, prices of SSDs have fallen tremendously, and performance has improved so much that even an entry-level SSD would leave the fastest mechanical hard disk drive in the dust.

If you're on a budget, simply get an SSD with enough capacity to house your OS and applications, and leave the rest of your files, photos, music and videos on your hard disk drive. This way, you would have the best of both worlds. Generally speaking, a 240GB or 256GB SSD should suffice for this purpose, and should set you back as little as \$150.

18

PLAYING YOUR FRIENDS' GAMES ON YOUR PLAYSTATION 4

If you have a friend who has a ton of digital games, you can borrow those games to play on your PlayStation 4 if you do these simple steps. First, you're going to need the login info of your friend's account, so this obviously has to be done with their knowledge.

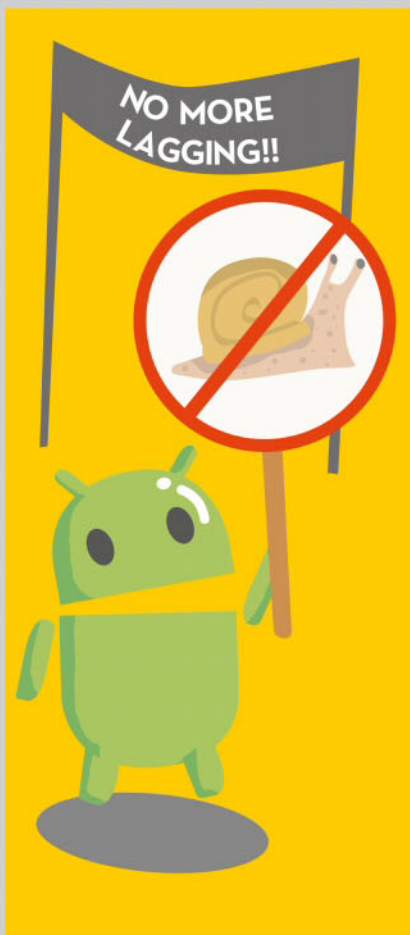
Next, log in to your PlayStation 4 using their account. You should be asked if you want to activate the PlayStation 4 as that account's primary console. What that means is the system is asking if you want to bind your friend's account to your console, so say yes when prompted.

Now all you need to do is go to the Library section and download whatever it is you want from your friend's account. Once you've downloaded what you want, just log out of the account and log into your main one.

Wait for the downloads to finish and then you can run the downloaded games as if you own them. There's a caveat though, you can only register a PlayStation 4 console to an account once every six months, so for the next six months your friend's account is bound to your console. It's no big deal though as your friend can still play all the games he downloaded to his console too. Just make sure he's connected online as an offline connection on a PlayStation 4 that's not the primary console won't work.

BANISH LAGGY TRANSITIONS ON ANDROID

For all of its open-source goodness, Android has often been given a bad rap for laggy animations when compared to iOS. Fortunately, there's a relatively quick fix for all that. Simply go into your device settings, navigate to the "About Device" sub-menu, and look for your device's build number. Tap this entry seven times - you'll see a toast message telling you you're about to enter Developer Mode - to enable Developer Options. When you're done, you should see a new menu item called Developer Options under your System settings. Enter the sub-menu and look under the "Drawing" menu header. You should see options for Window animation, Transition animation, and Animation duration scales. Change all of these from the default 1x to 0.5x, and you're done! Exit the menu and notice how your phone suddenly feels a lot snappier when switching applications and windows.



OVERCLOCKING YOUR GRAPHICS CARD

Any discerning PC gamer should have a discrete graphics card in his desktop system. Besides forking out dole for the latest graphics cards, another way to give your gaming a quick boost is to overclock the graphics card.

For starters, get an overclocking software utility like AfterBurner from MSI. With this utility, you can increase the operating frequencies of the card's graphics core, as well as the video memory modules. On top of that, the utility also offers performance monitoring charts, so that you can scrutinize the card's performance levels, as well as its power draw and temperature.

Most graphics cards have built-in operating thresholds; hence, the dangers of frying your graphics card from overclocking are kept at bay. However, don't go ballistics with the overclocking overheads, and make increments to the operating frequencies of the card gradually. Such baby steps will ensure stable performance gains, and give your gaming experience a much needed boost.



SHOOT IN RAW

If you want to get the highest image quality possible from your digital camera, try shooting in RAW. When saving in JPEG, a camera will interpret color, reduce noise, and compress file size by throwing away data and saving other adjustments. A camera raw file however, contains minimally processed data from the image sensor, so you get a wide range of 'raw' data.

Raw files are the highest quality files you can get out of a digital camera; but they're also the largest in size and require special apps to view. Not all digital cameras let you save in the format, but most advanced compact, mirrorless and DSLR cameras do.

Raw files are often called digital negatives, because they look bland in their raw state, and must be developed in an app like Adobe Lightroom, then saved to a more user-friendly format like JPEG to share with others. But the extra effort gives you pictures with a wider dynamic range, richer colors and more detail.

22

ACCESSING DIFFERENT REGION STORES ON CONSOLES

If you're a console gamer, you might not know that consoles too have their own regional marketplace for content, and each region could have access to different content. Whether you're on an Xbox or PlayStation, the only way to access another region's marketplace is via a new account and a fresh email. Depending on how many marketplaces you want to access, you might need a few email addresses.

Create a few new email addresses and choose your location to the region's store you want to access. For example, if you want to access the US Xbox Live Marketplace, when you're creating an email account, put your location as the US. You can get a legitimate address easily by looking online, or by using a freight forwarding service, since they usually provide you a custom address to ship to. Once your email's up and running, you need to create an account on whatever console it is you're playing. In the account creation process, you link your account to the email earlier and then if asked, specify your location again. If done right, you should be able to access other regions' stores now.

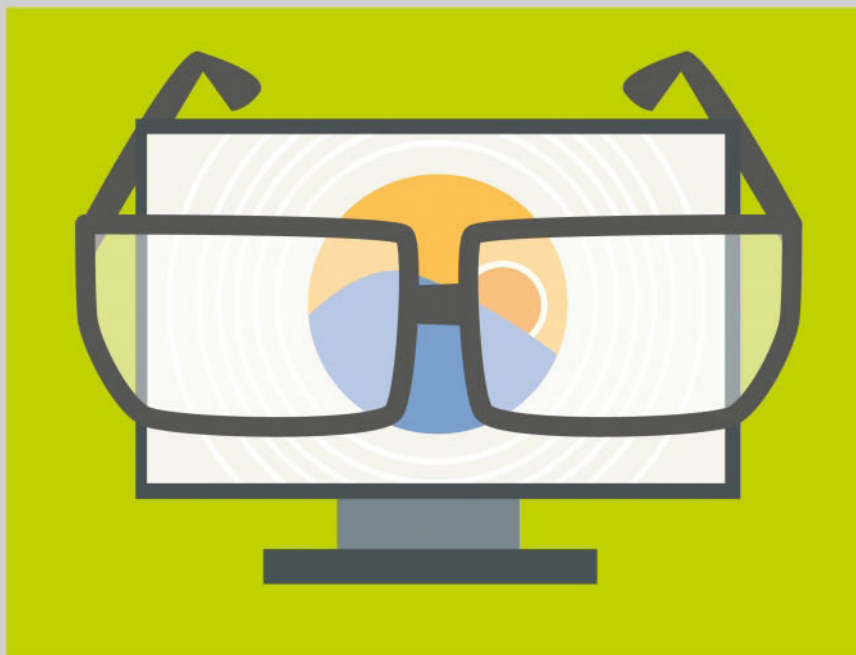
To be safe and cover all the different regions, you'll need at least four different accounts; one for the local PSN or Xbox Live, one for the Japanese stores, one for the US stores and one for the European one. So if you're gaming on both a PlayStation and Xbox, you're going to need 8 different accounts total. Better keep a notebook handy to keep track of them all.



23

SAVE ON BLUE LIGHT FILTER LENSES WITH F.LUX

Opticians will have you believe that blue light from our computer displays is bad for our eyes and recommend you to purchase special lenses that filter out blue light. These lenses obviously command a premium, but a quick and cheap workaround is a software called f.lux. F.lux is an application that can remove blue light from your display, thus saving you the hassle and cost of getting those special lenses that filter out blue light. The best part about this is that you can turn it off at any time, so it is great even if you are doing work that is color-sensitive.



24

RETRIEVE A FORGOTTEN WI-FI PASSWORD

It's happened to the best of us. We come up with a convoluted password to keep our neighbors out, only to have it slip through the cracks of memory at the most inopportune moment. Fortunately, you can retrieve your password from either your computer or router. If you've connected to the network in the past, the password is likely already saved on your PC. Press Win+R, type `ncpa.cpl` in the box, and hit enter. Right-click the network you want to connect to, select Status, and click the "Wireless Properties" button. The password can be found in the Security Tab (ensure that "Show Characters" is checked!).

Alternatively, if you don't have a Wi-Fi-connected PC on hand, you can retrieve the network password from your router. However, you will need to connect either your laptop or desktop PC to the router via an Ethernet cable in order to access its web interface. The router's IP address can usually be found in the manual. But if you can't remember when you last saw the manual, you can retrieve the IP address by searching for Windows Command Prompt in the search bar and entering "ipconfig" into the command window. Your router's IP address can be found next to the Default Gateway header.

Next, key in the address into your browser's address bar and enter the log-in details. Chances are, you haven't bothered to change them from the default. You can check the bottom of your router (or the manual) for the username and password or look them up online. Once you're in, head to the Wi-Fi section and look for the Wi-Fi password. This time, perhaps you should write it down or change it to something that is easier to remember.

25

SYNC BROWSER DATA ACROSS DEVICES WITH CHROME

A major advantage with using the Chrome browser is that it's available across most of the popular platforms like Android, iOS, Mac OS X and Windows. But more importantly, Chrome has a sync feature which lets you sync browsing information, like bookmarks, passwords, auto-fill, opened tabs and history. Doing it is as easy as going into Settings and then signing into Google Chrome using your Google account. This will allow you to access all the aforementioned details across multiple devices.

26

FIXING STUCK PIXELS

Stuck pixels can be quite an eye sore. Fortunately, you don't necessarily have to take your monitor down to the service center as there are a couple of things you can try to fix it at home. The website JScreenFix offers a quick fix that you can try. Scroll to the bottom of the page and click the "Launch JScreenFix" button. This will bring up a small square of animated static that you can then drag over the stuck pixel. Let it sit for about 10 minutes, and with some luck, your LCD panel will be as good as new. The idea here is to cycle the color value of the pixel in an attempt to reset it and bring it back to life.

27

TURN OFF AUTOMATIC RENEWAL IN APPLE MUSIC

Although Apple Music provides a free three month trial, users were also forced to pick a subscription plan which would be automatically renewed after the trial ends. Fortunately, this can be turned off.

Simply head to "Settings" and then go to "iTunes and App Store". Tap on your Apple ID and select "View Apple ID". You will be prompted for your password, enter it. Scroll down to "Subscriptions" and tap on "Manage". You will be greeted a screen showing your renewal options and when payment will begin, simply disable automatic renewal if you do not wish to subscribe to Apple Music after the trial ends.

28

RECOVER OLD WHATSAPP MESSAGES ON ANDROID

If you've ever wanted to restore your chat history to an older backup, here's quick way to do it. Your chat backups are stored in the "/sdcard/WhatsApp/Databases" folder, so that's where you'll need to go to. You can do it via a file explorer app on your phone or by connecting it to a PC. You'll see files in the following format: msgstore-YYYY-MM-DD.1.db.crypt. Locate the correct backup file via the timestamp and rename it to the most recent date, overwriting any more recent backup if you need to. After you've done that, all that's left is to uninstall WhatsApp and follow through with the standard message restore process.



29

EMERGENCY BATTERY CHARGER

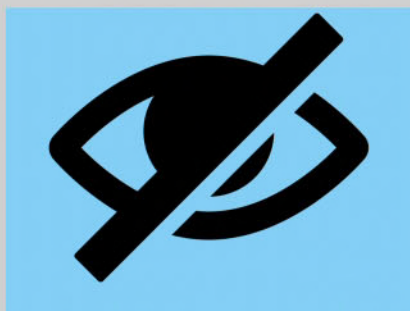
If you're really up hard up for a battery charge to charge your device, and it's really an emergency, you can try creating a battery charger from a 9 volt battery. You need the battery, a key and a USB car charger adapter and of course your USB charging cable. Press the tip of the key on the negative end of the battery and the car charger on the positive end of the battery and plug in your phone to the car charger. Make sure the key is in contact with the contact points at the sides of the charger. Voila! A manual charging device.



30

TURN OFF "SEEN BY" NOTIFICATION IN FACEBOOK MESSENGER

Read receipts are one of those things that appear useful at first, but later turns into something that everyone wish had never been invented in the first place. This time, the solution takes the form of easy-to-use browser extensions that disable the feature. You just have to download the Facebook Unseen extension in Google Chrome, and it'll do the rest automatically. Alternatively, if you're a Firefox user, there's an extension called Unseen that does the exact same thing. So go forth and ignore your friend's messages, free from the heavy burden of guilt!



31

STOP GOOGLE CHROME FROM HOGGING YOUR RAM

Google Chrome is fairly reliable, thanks to the fact that it handles every tab, plug-in, and extension as a separate process. So if a particular plug-in crashes, it doesn't take the whole browser down with it. This is great, but it also means that Chrome takes up an inordinate amount of memory, especially when you have multiple tabs and extensions running at once. It's not unusual for Chrome to take up as much as 5GB to 8GB of RAM if you have dozens of tabs open.

To put a cap on Chrome's appetite, you can open up Chrome's Task Manager. This is found under Settings, More tools, and then Task manager. Pay attention to the "Memory" column, as these will identify the most memory-hungry browser elements. Clicking the "Memory" header sorts the items by highest RAM usage to the lowest, so you can pick out the most egregious culprits and shut them down.

Many memory hogs are likely browser extensions, which you can disable under Setting, More tools, and then Extensions. Turn off whatever isn't necessary by unchecking the "Enabled" checkbox next to the extension. It's also a good idea to stop plug-ins from loading automatically by enabling Click-to-Play. You can do this by clicking "Content Setting" under the Advanced settings header and then selecting the option that says "Let me choose when to run plugin content". The good thing about Google Chrome is that there are plenty of extensions, so you can always try alternative extensions and pray that it's less memory intensive.

Finally, the obvious solution is to keep your tabs to a minimum, but if you just can't give that up, you can look to an extension called The Great Suspender, which basically suspends unused tabs to free up system resources. Maybe a cluttered tab bar makes you feel productive, and now you can take comfort in your assiduous surfing habits while knowing that your system isn't thirsting for more RAM. The tabs will still be there if and when you need them, but they'll take longer to load. This can also help fight Chrome's issues with memory leaks, where RAM doesn't get freed up even after a tab is closed.

32

MASTER OS X'S MENU BAR

The menu bar in OS X is a fixed toolbar that spans the entire width of your screen. It provides access to various system functions, application specific functions to apps that are currently active and also quick access to other utilities.

The Apple logo on the left most side of the menu bar gives you access to information about your machine, system preferences and also the App Store. "About This Mac" is a nifty way to check your system's specifications, storage usage, serial number and warranty coverage. When clicking on the Apple logo, holding down the "Option" key turns the "About This Mac" shortcut to "System Information", which gives a more detailed look at the components of your system. Holding down onto the "Option" key also lets your log out of your account, restart and shutdown your system immediately without any of the usual warning pop-ups.

On the right most side of the menu bar you will find icons for things such as Wi-Fi, volume control, time, date and so on. If you do not like the way they are arranged, they can be moved about by holding on to the "Command" key and clicking them on them. You can also add additional shortcuts to the menu bar through "System Preferences". For example, if you need to type in multiple languages, you can add the input sources menu into the menu bar. This way, you can change your input language much more conveniently.

Additionally, holding down on the "Option" key can reveal additional options and information about certain processes. For example, holding the "Option" key and clicking on the Wi-Fi icon will show you your IP address, security setting, Wi-Fi channel, signal noise and transfer rate. Do the same with volume control and you can immediately switch between your input and output sources.

33

SHOOT IN ADOBE RGB

Most digital cameras are set to the sRGB color space when saving to JPEG. sRGB is a widely adopted color space for use on the internet, computers, monitors and printers, and is more likely to display the same colors accurately across multiple devices, all of which have different color profiles. However, sRGB is a narrow color space, when compared to a color space like Adobe RGB, which means that fewer colors are being saved to the picture.

If you have a decent modern monitor and printer, chances are that they might be able to show you a good range of the colors available in Adobe RGB. Modern browsers have also evolved to be able to display Adobe RGB JPEGs more accurately. But there's a bigger advantage to saving in Adobe RGB: If for some reason you need to convert your Adobe RGB picture to sRGB you can, but you can't do the reverse. If your camera lets you switch color spaces, switch to Adobe RGB for more colors in your photos.

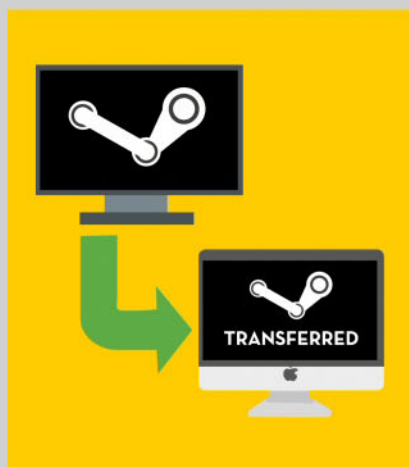
TRANSFERRING STEAM AND ORIGIN GAMES

Here's a handy tip for you if you're on Steam and play on multiple PCs and don't want to keep downloading a game every time you move between systems.

Go in your Steam folder, navigate to "Steamapps" and select it. There should be a folder inside called "Common". Open it and copy the title you want to transfer over to the second PC. Paste that folder into your external storage drive and then run Steam on the second PC.

While Steam is running, navigate to your Steam directory on the second PC and install the file you copied from the first PC into the second PC's Common (c:\Steam\Steamapps\common\nameofgame) directory. Now, using the second PC in Steam, download the game you just pasted into the Steam directory. When prompted for the directory that you want to save the game to, simply point to folder than you just pasted into the Steam directory. Steam should detect and verify it and you'll be all set to go. This method works with most games, except online-only titles like Grand Theft Auto V.

This tip works for Origin too, though the steps are a bit different. To do it for Origin games, find your Origin folder and then copy the game you want to transfer to an external storage drive. Then paste the copied file anywhere you want on your second PC. Start the Origin client on the second PC, go "Application Settings" then "Advanced". Look under the section called "Downloaded Games" and direct it to your new folder. Then just download the game via Origin normally. Origin should verify the contents in the new folder and make it usable.



CUSTOMIZE YOUR ANDROID HOMESCREEN

Zooper Widget Pro is a fairly straightforward and powerful app that lets you customize your Android homescreen and make it truly your own. There's a free version on the Google Play Store, but you'll need the Pro version (\$\$4.05) to load custom templates. Websites like mycolorscreen.com are great places to visit for beautiful, pre-designed templates if you don't feel like customizing your own. Zooper Widget works best when paired with a custom Android launcher like Nova launcher, and each template usually comes with detailed instructions on what settings to go for on options like homescreen grid size and margins.

To begin, download your template of choice from mycolorscreen.com to your phone. You may need to extract it if it is a .zip file. Next, configure your Nova launcher settings as instructed. Long-press on your home screen and select Widgets. Scroll down to the Zooper Widget options and select the size that's closest to the one you need. Drag and drop it onto your homescreen and resize if needed. Tap onto the widget to bring up the Zooper Widget menu and select the SD Card option to load your downloaded templates.

Once the template is on your homescreen, you can tap anywhere to bring up Zooper Widget's configuration menu. In the "Layout" menu, you can view the individual elements of the template and assign custom actions or apps to them. You can also add new elements or delete those you don't wish to keep. However, everything is usually good to go, and we recommend simply entering the "Widget OnTap Action" menu and selecting "Disabled (Locked)" to prevent any further accidental presses.

If you're lost in the sheer variety of templates available, we'd like to direct you to the Screens of the Day tab on mycolorscreen.com which consists of handpicked templates from the site's editors.



36

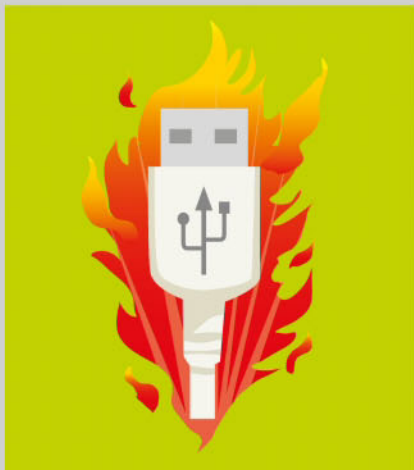
ENABLE TRIM SUPPORT FOR THIRD-PARTY SSDS IN OS X YOSEMITE

The latest version of OS X Yosemite 10.10.4 now enables TRIM support for Mac owners who have upgraded their machines with third-party SSDs. Previously, TRIM support was only available for Apple's OEM SSDs. TRIM helps SSDs by telling them which parts of the drive are unused and can be written with new data. It's not necessary for SSDs to function, but it could help improve performance of drives that have been in used for some time and have been filled up with lots of data. To enable TRIM, open the Terminal app and enter "sudo trimforce enable". Be sure to backup your system before doing so.

37

BOOST USB TRANSFER SPEEDS

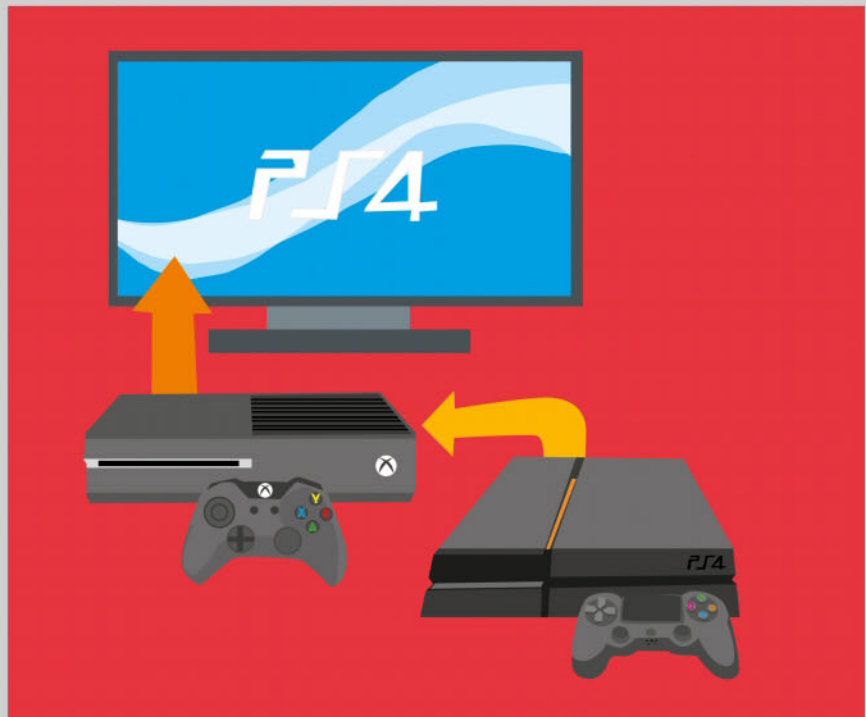
If you're a stickler about USB performance and own an Intel PC, this one's for you. Enter BIOS as your PC is booting up (you usually have to hit F2 or Delete, but this may vary according to your motherboard) and navigate to the Advanced menu. Enter the CPU Configuration sub-menu, followed by CPU Power Management Configuration, and look for the options for Enhanced Intel SpeedStep Technology and CPU C-States. Disable both of them and then save and exit the BIOS to reboot to your desktop. Once you're there, head to your Control Panel to visit the Power Options setting. Simply set your preferred power plan to High Performance, and enjoy faster file transfers from your external hard drive!



38

DISPLAYING ANOTHER DEVICE'S OUTPUT ON THE XBOX ONE

Did you know the Xbox One has a HDMI input port? That means that you can access basically any device with HDMI output if you plug it into the Xbox One. You can plug in everything from notebooks to rival consoles (like the PS4) into the Xbox One's HDMI input port and you'll be able to view their displays from within the Xbox's TV app. If your display is short on HDMI ports (or are too lazy to keep switching channels), this is a great short-cut to save you time.



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SEARCH GMAIL AND ADDRESS EMAILS FROM CHROME'S ADDRESS BAR

Cloud storage and the ability to sync across devices make things very simple. But let's face it, we're lazy people. If there was a way to cut just one more click out of a certain procedure, we'd take it, which is why we're going to show you how to search your Gmail inbox and begin composing an email right from your Google Chrome address bar.

Enter Settings in Chrome's main menu and select "Manage search engines" under the "Search" section. Look for three blank fields that prompt you to add a new search engine, keyword, and URL. Name the first field "Gmail Search" for easy identification. The keyword field is the shortcut that you will use to access the search function, so it can be anything that's easy to remember for you. Finally, enter "https://mail.google.com/mail/ca/u/0/#search/%s" into the last field and hit Enter to add a new search engine.

Next, name the search engine "Send Gmail" and enter another shortcut of your choosing. Key in "mailto:?to=%s" in the final field and press Enter to finish up. Check to make sure that Chrome hasn't added an "http://" to the second URL, and then click "Finished" to exit the menu.

Now go to your address bar, enter the keyword shortcut you chose previously, and hit the spacebar. You should see a pale blue box appear in the address bar indicating that your search will now be performed within Gmail. Enter whatever you'd like to search for, press enter, and you'll be taken right to the search results in your Google inbox. To begin composing an email, do the same thing with the corresponding shortcut. You can't compose the entire message in the address bar, but you'll be taken to a full-screen version of Gmail's "Compose" box.

USING A PS VITA AS PLAYSTATION 4 CONTROLLER

This one's great if you have only a single PlayStation 4 controller but want to play local multiplayer games with a buddy. It'll allow you to use the PS Vita as a PlayStation 4 controller, complete with all the functions of a normal PlayStation 4 controller.

To do this, turn on the PlayStation 4 and PS Vita. Log in to the PS Vita with a user. Make sure that PlayStation 4 and PS Vita can recognize each other first. You'll need to go into the Settings section of the PlayStation 4 then go to the menu called "Remote Play Connections". Enter it and click on the "Enable Remote Play" box. Now on the Vita, you just need to run the PlayStation 4 Link app. Once done, you'll see a list of nearby PlayStation 4's you can connect to. Simply connect to the one you want and you're all set.

Normally, this is where you'd stop if all you're interested in is Remote Play. To use the Vita as PlayStation 4 controller on the other hand, you'll need another use to log in to the PlayStation 4, via the DualShock 4 controller. Press and hold the PlayStation Home button and log in as another user, other than the user that's on the PS Vita. It's important not to log out the Vita user too.

Now simply run any game that supports local multiplayer and you'll find that the player on the PS Vita can play as if he's using a DualShock 4 controller. There's even an extra bonus; the player on the PS Vita can use the device's screen instead of looking at the TV as gameplay is broadcasted to it too.



USING AUTOCORRECT TO YOUR ADVANTAGE

Autocorrect can not only help correct your spelling and grammar but if you fiddle around, you can actually use it to create your own abbreviations or shortcuts for longer words. To do that, simply access the dictionary on your device and then create a new entry. For example, you can create your own abbreviations such as "brt" to mean "be right there". This way, the next time you input "brt" it would automatically be corrected to "be right there".

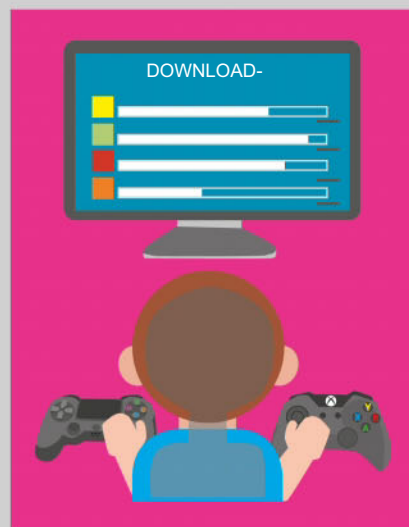
FREE CONSOLE GAMES

Whether you subscribe to Xbox Live or PS Plus, the two services have something in common; they give away a selection of free games every month. For PS Plus, it's usually a mix of PS4, PS3 and PS Vita titles. For Xbox Live, it's usually Xbox One and Xbox 360 games. When it's time to download them, just download every title on offer, even if you don't have the corresponding system. Both PSN and Xbox Live will log your downloads as "purchases" enabling you to re-download them at a later date.

However, note that this is best done on the PSN and Xbox web store as this will allow you to see all the games that are available. If you tried doing this on your old PS3 for example, you will only see free games for the PS3 and miss out on those for the PS4 and PS Vita.

When a game's "purchased" this way, your account will be recorded as having the game. That way, if you get your hands on a PS Vita (or whatever system) later, you'll have already built up a library of titles you can download.

While the list of titles on offer is rotated every month, those you've "purchased" stay free and tied to your account. So even though Halo 3 might not be offered for free that particular month, as long as you've "purchased" it when it was free, it'll still be considered free for you. This is invaluable especially if you own an Xbox One since Microsoft is making Xbox 360 games compatible later in the year. So instead of dragging out physical copies of the games you have, you can simply download the digital versions off the marketplace.



43

SPEED UP GOOGLE CHROME

Despite its reputation for being quite a memory hog, Google Chrome is still the browser of choice for many people. But in true Google style, Chrome comes with a bagful of experimental features and tricks that you can play around with to boost performance. To access these goodies, just enter “chrome://flags” into your address bar.

The options aren’t arranged in any particular order, so the quickest way would be to hit Ctrl+F to search for the relevant option. You can start by searching for the “Maximum Tiles” option and changing it from Default to 512. This first tweak increases the RAM that Chrome can use, definitely a welcome change given how much resources Chrome can consume. It should have the effect of improving scrolling and navigation performance.

Next, in order to improve image loading performance, you can go to the “Number of raster” option and change the number of threads to 4. You can also attempt to speed up page loading by helping web transactions along. This works by navigating to “Enable SPDY” and clicking the “Enable” link below it. The text will change to say “Disable”, so you know the feature is indeed turned on.

Another option to look at would be “Enable Experimental Canvas”. Like the previous modification, you click the “Enable” button to use the feature. This tweak allows Chrome to utilize opaque canvases to increase page loading times and provide an overall performance boost. Finally, if you’re in the habit of perusing walls of text, there’s the “Accelerated Overflow” option. Enabling it compiles content into a single layer, which may bring improvements in scrolling performance.

At the end of the day, bear in mind that these features are still experimental and may not all work as professed, so it’s up to you to try out different combinations and see what works best for you.

44

REVIEW YOUR WORK WITH OS X’S SPEECH FEATURE

It is easy to miss out on mistakes if you are reading your own work, more so if you are reading silently. It’s always better to find someone go through your work, but finding that someone is not always easy. Fortunately, OS X can help. If you spend a lot of your time writing like us, OS X’s Speech feature is a handy way of reviewing your work. Using the Speech function, we can have OS X read out our work to us, which is a better way of spotting glaring mistakes. And if you find this feature really nifty, you can even have it on short-cut - the default short-cut is pressing the “Option” and “ESC” key together.



45

EXTRA PASSWORD SECURITY

If you don’t want to use a password manager for all your password needs, here’s an easy way to create a more secure password. Instead of using numbers as a substitute for letters, use accents instead. For example, don’t use e, use è instead. That makes it harder to guess. On a desktop or notebook keyboard, you’ll need to enter a specific code to get the special letter you want (have a look at <http://symbolcodes.tlt.psu.edu/accents/codealt.html> for the codes), though on mobile keyboards you can just press and hold on a specific letter to get all variations of it.

46

REDUCING IN-GAME LATENCY

Twitch action multi-player games like Counter-Strike: Global Offensive often come down to the millisecond. If you saw your opponent a frame earlier, that might just be the difference between getting the frag or dying. If you own an NVIDIA graphics card, you can reduce latency via the NVIDIA Control Panel. Navigate to “Manage 3D settings” in the side menu and look for the “Maximum Pre-Rendered Frames” option and set that to 1, this reduces the time it takes for the GPU to deliver the frame to the display. Next, check the settings for “V-Sync” and ensure that it is off. These tweaks may not seem like much, but they can help give you that slight competitive edge.

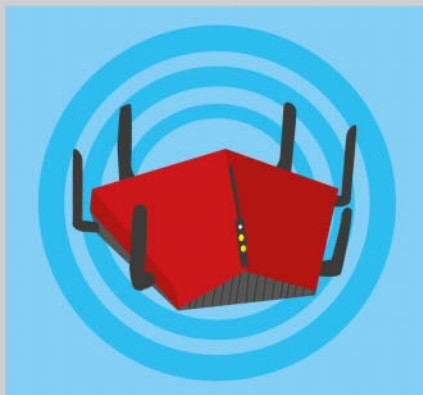
47

INVEST IN AN AC3200 ROUTER

When was the last time you counted the number of devices you have connected to your router? How many connected devices do you think you have? Count and add them up - PCs, notebooks, smartphones, tablets, and don't forget your IP cameras, smart home plugs and any Internet of Things devices you might have. If you happen to have a large family, chances are there could be as many as twenty devices connected to your router. That's a lot of devices that a single router needs to serve.

And because of the current limitations of router technologies, connecting multiple devices, especially if they are all active at the same time, degrades performance. The best workaround to this problem is to invest in an AC3200-class router. These are tri-band routers that broadcast three separate networks - two independent 5GHz networks and a single 2.4GHz network. The additional 5GHz network provides 1300Mbps of extra throughput, giving a maximum theoretical data transfer rate of 3200Mbps - 1300Mbps each from the 5GHz bands and 600Mbps from the 2.4GHz band.

Why would anyone need another 5GHz band? Apart from the additional bandwidth, the reason is because not all devices that support 802.11ac are equal. Most smartphones and tablets, for example, are single stream devices that do not fully maximize the 1300Mbps throughput offered by routers. And if connected on a single network, these slower devices must contest for bandwidth alongside faster ones like notebooks. Hence, the idea of an additional 5GHz band is to put the faster devices on one and the slower devices on the other. This way, on the faster band, the amount of time needed to serve each device will be kept down to a minimum, allowing it to quickly serve one device and then the next.



48

USING APPLE WATCH WITH CARPLAY

Apple may not advertise this, but did you know that Apple Watch works perfectly with CarPlay? A useful way of making use of this is to use your Apple Watch to get directions before entering the car. This way, the moment you hook up your iPhone to the car, the directions would be displayed on your in-car display. And just for kicks, you can also use your Apple Watch to control music playback on your in-car entertainment system.



49

USE THE "PING" COMMAND TO FIND OUT IF YOUR NETWORK IS REALLY DOWN.

The only thing more frustrating than a wonky Internet connection is when the LED status indicators on your router tells you that nothing is wrong and yet you still cannot connect to a website. One way to check if your Internet is really down is to use the "ping" command. For Windows users, go to Command Prompt and type just key in "ping" followed by the URL of any website you go to. For Mac users, open the Terminal app and do the same, "ping" followed by a URL. If your Internet connection is working properly, you should get a ping response indicating the time taken for the ping response.

50

USE SPOTLIGHT TO DO CURRENCY CONVERSIONS

Shopping online is addictive and lets you buy stuff from all round the world. However, converting currencies can be tedious. Thankfully, Spotlight in OS X Yosemite is more powerful than ever and one of the things it can do is currency conversions. Instead of relying on a website or widget, simply call up Spotlight by pressing on the "Command" key and spacebar together, and input the amount and currency that you want to convert. For example, "18000 usd to sgd" and Spotlight will automatically retrieve the latest currency rates and complete the conversion for you. It will even list the amount in other popular currencies. How is that for being helpful?

HOME-GROWN GOODIES

by Koh Wanzi

It's not every day that we see apps that were developed right here in our little red dot. While these apps may not often top the global charts, that doesn't mean that some of them aren't veritable gems buried in the rough – they may even prove to be more useful because of their local focus! In commemoration of SG50, we've rounded up a few home-grown apps that we think are worth your attention.

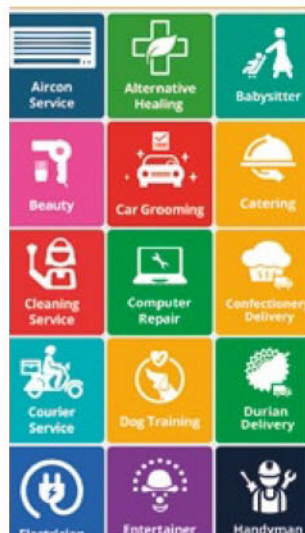
PAGE ADVISOR

iOS, Android
Free



We're all familiar with the convenience of e-commerce, but when it comes to intangible

services for hire, we often have to go the long route of calling up the company in question. Page Advisor changes that by allowing users to engage service providers and view merchant ratings via the app. Users fill up details pertaining to the job request, after which they will receive multiple quotes minutes after submitting the request. Page Advisor has agreements with up to 1,400 businesses in Singapore, and over 100 different services are already available on the app.



You can choose to hire services from a variety of clearly delineated categories.

CAROUSELL

iOS, Android
Free



Forget eBay. Carousell provides a convenient platform for users to buy and

sell pre-loved or new items straight from their mobile phone. The app allows anyone to set up their own electronic store front, providing a way to make a quick buck from used items or snap up good deals from other users. Users can chat with each other in the app itself, so you never even have to leave the app to close a deal. With over 8 million listings worldwide and product categories ranging from fashion to tech, you're almost guaranteed to find something you want here.



Carousell lets you buy and sell items straight from your mobile phone.

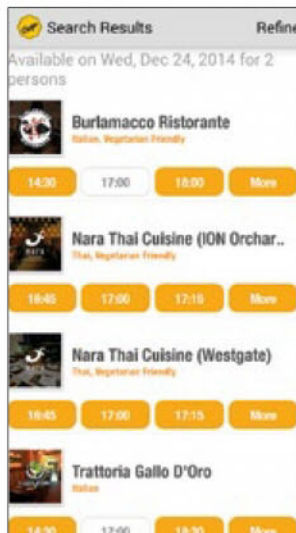
CHOPE

iOS, Android
Free



Chope makes your life easier by allowing you to make online reservations instantly in

the app itself. You are almost certainly always with your phone, and Chope makes things really convenient by placing information like address, opening hours, price, reviews and even pictures at your fingertips. The app even features menus and recommended dishes from its food writers and the occasional promotion! Furthermore, it's a great way to discover new eateries, and now you can reserve a table without even leaving the app or needing to make any calls.



Chope allows you to easily view the timings available for reservation at restaurants.

NEWSLOOP

iOS, Android
Free



There are many great news aggregator apps out there, but it's often difficult to find

one that will give you a comprehensive overview of regional news. Newsloop just does that, bringing together the best of local and international news stories from over 600 publishers in the Asia Pacific region. You can choose from over 30 categories of news and lifestyle topics to personalize your own newsfeed and stay updated on the topics that matter to you. Furthermore, you can create up to 10 profiles on a single account to better manage the glut of information out there.



Newsloop displays top stories in a visual-centric flow view.

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The all-new PROLiNK® PRT7007L is a portable 4G LTE WiFi Hotspot device that is able to attain a top speed of 150Mbps. Simply insert a 4G or 3G data SIM card, and the device will allow easy access to internet for up to 15 devices and for up to 10 hours of use. The PRT7007L is also IPV6 ready and supports both 2.4GHz and 5GHz signals, making it easy to extend your dual band Wi-Fi signal wherever you are.

With a light weight of 106g and a conveniently sized LCD screen that helps to keep track of signal strength, connection status, number of connected users and battery status, the PRT7007L is a must-have for the frequent travelers who desire a compact mobile hotspot that packs a punch.

LTE FDD (Cat4): DL 150Mbps, UL 50Mbps

LTE TDD (Cat4): DL 117Mbps, UL 9Mbps

WiFi: 2.400-2.4835GHz / 5.180-5.240GHz Frequency Band

Dimensions: 104 x 65 x 14.6mm (L x W x H)

Weight: 106g (with battery)

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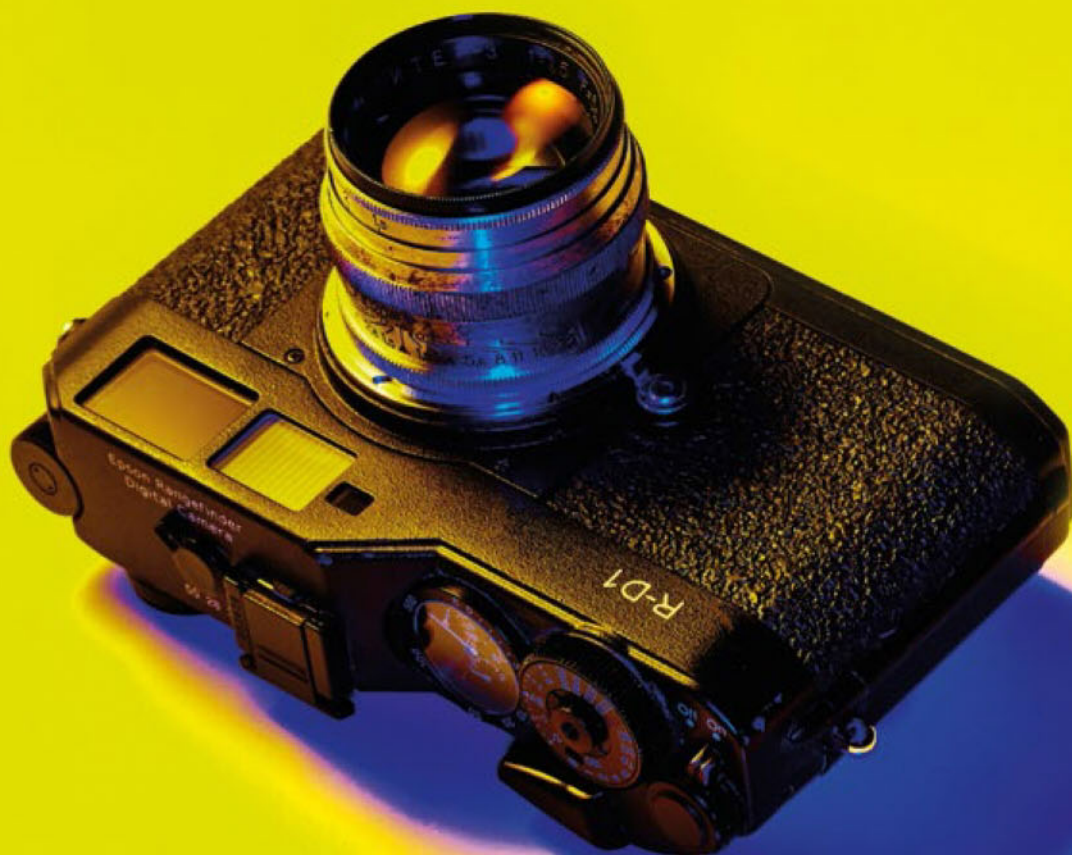


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The Epson RD-1, jointly developed by Seiko Epson and Cosina in 2004 lays claim to both the world's first digital rangefinder and digital mirrorless interchangeable-lens camera (MILC).



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